PUBLIC HEALTH REPORTS

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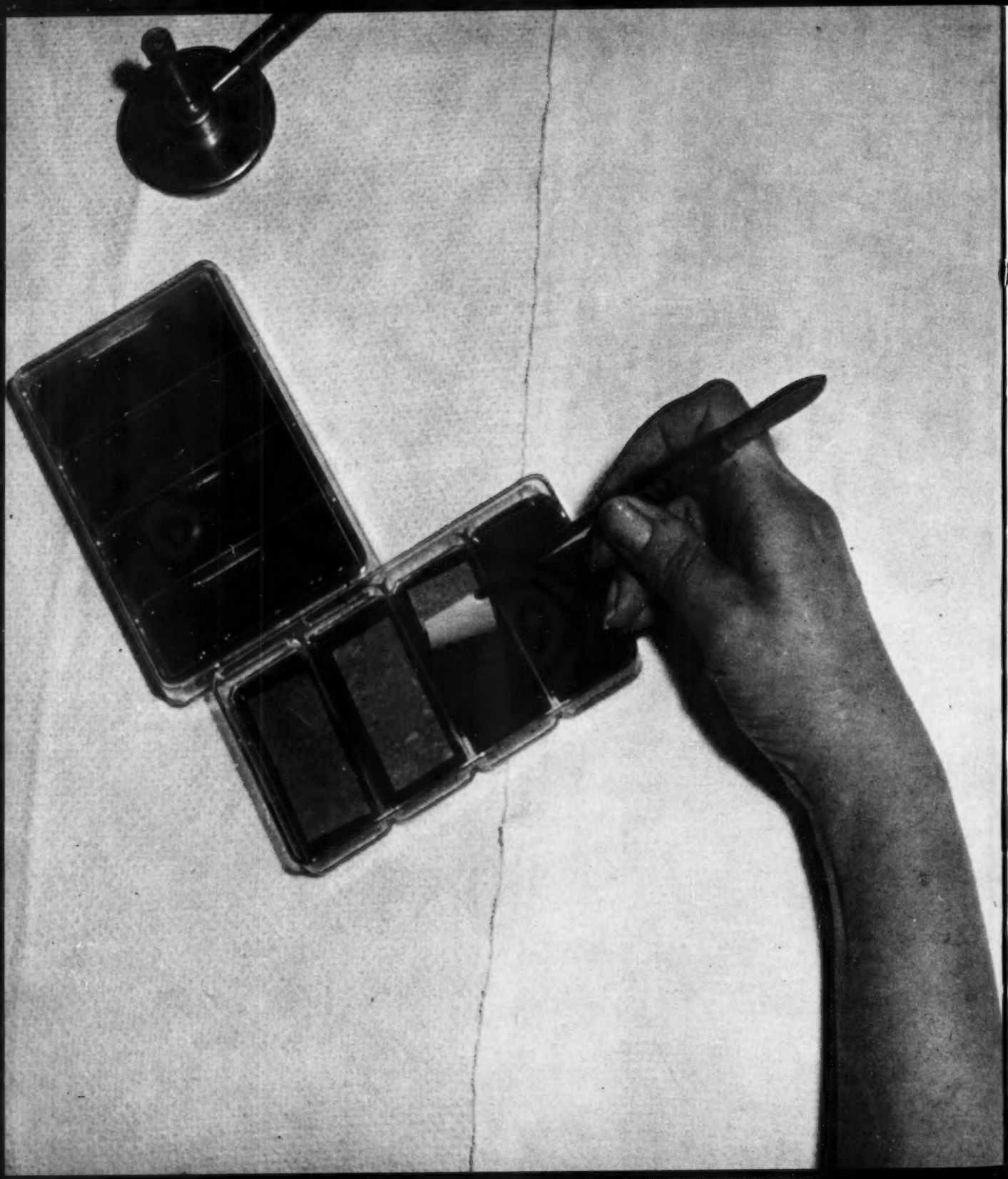

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frontispiece

A filter paper strip is plated on blood agar medium. Article on pages 251–259 describes the effectiveness of the strips in the transport of streptococci by mail.

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PUBLIC HEALTH REPORTS

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U.S. DEPARTMENT OF HEALTH, EDUCATION, AND WELFARE
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PUBLIC HEALTH SERVICE
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Factors in Diagnosis and Classification of Deaths from CVR Diseases

IWAO M. MORIYAMA, Ph.D.

OVER one-half of the deaths occurring annually in the United States are attributed to cardiovascular-renal diseases (CVR). As may be seen from table 1, the largest frequency of deaths is found in the component arteriosclerotic heart disease including coronary disease. Next in frequency are vascular lesions affecting the central nervous system, and the hypertensive diseases. With the decline in mortality from infectious diseases generally, cardiovascular diseases of infective origin now constitute less than 5 percent of the total CVR disease mortality.

Marked differences in death rates appear for the various demographic characteristics as well as geographic areas. The reasons for these differences are not all clear. Nor is there agreement that the recorded differences are real. Some feel that the problems of diagnosis, reporting, and classification of these diseases are of such a nature that no valid assessment of mortality trends and differentials is possible. Others feel that despite the shortcomings of the data, mortality statistics provide useful indicators of the general trend and magnitude of CVR disease mortality. This disagreement is rooted in the lack of quantitative information with respect to these problems.

Various factors complicate the interpretation of CVR disease mortality statistics. First, there is the question of the reliability of the diagnostic data on which the medical certification of causes of death is based. There are several facets to this problem. The prevailing concept of disease and diagnostic criteria of the day provide the background for medical practice. The amount and quality of diagnostic evidence available to the medical certifier, and the diagnostic acumen of the attending physician determine the quality of diagnosis made. At this point, it should be recognized that diagnoses are judgments arrived at after a study of available clinical and pathological observations. Even with standard diagnostic criteria, it is highly unlikely that absolute accuracy in diagnosis will ever be possible for diseases of the CVR system because of the varying medical backgrounds and experience of the relatively large population of physicians.

There can be no question that over the years there has been a great increase in knowledge with resultant changes in the concept of cardiovascular-renal diseases. The development of diagnostic criteria and techniques and improvements in diagnostic facilities and methods have undoubtedly influenced cardiovascular-renal disease mortality statistics. For example, the diseases of coronary arteries which today are the most important component of the CVR disease complex were not reported with any great frequency as a cause of death until about 1926. Halsey, cited by Hedley (*1*) and Atlanson (*2*), has pointed out that there has been a change in emphasis in the diagnosis of heart disease away from valvular to myocardial diseases and more particularly to the coronary vessels which supply the myocardium. Levy's review (*3*) of the clinical and pathological rec-

Dr. Moriyama is chief, Mortality Analysis Section, National Office of Vital Statistics, Public Health Service. *This paper was prepared for presentation at the annual meeting of the American Statistical Association in December 1958, Chicago, Ill.*

Table 1. Number of deaths and death rates for the components of major cardiovascular-renal diseases, United States, 1956

Major cardiovascular-renal diseases	Number of deaths	Rate [1]	Percent
Total	854, 152	510. 7	100. 0
Vascular lesions affecting central nervous system	177, 845	106. 3	20. 8
Rheumatic fever and chronic rheumatic heart disease	20, 029	12. 0	2. 3
Arteriosclerotic heart disease, including coronary disease	427, 516	255. 6	50. 1
Other heart disease, except hypertensive	84, 090	69. 5	9. 8
Hypertensive diseases	83, 341	49. 8	9. 8
Other cardiovascular-renal diseases	61, 331	17. 5	7. 2

[1] Rate per 100,000 estimated population.

ords of the New York Presbyterian Hospital for the period of 1920 to 1930 showed that although the incidence of coronary disease in the pathological records was fairly constant each year (10 to 12 percent) throughout the decade, there was an increase of 400 percent in the frequency of clinical diagnosis of various forms of coronary diseases. Levy states that "It was after the publication of the papers of Herrick in 1912 and again in 1919 that interest of the profession in this country was aroused in the problems of acute coronary obstruction, and in the succeeding years clinicians became more alert in recognizing the disturbance in the coronary circulation and recorded them more frequently."

Other significant changes in the concept of CVR diseases relate to the vascular changes caused by diabetes (*4*) and the possible etiological relationship between cholesterol and atherosclerosis. The role of hypertension and the effects of therapeutic procedures on hypertensives are beginning to be better understood. These developments have an impact upon the diagnosis of CVR diseases, but it is not possible to determine the extent to which the statistics on CVR disease mortality are influenced. Undoubtedly, however, data on the individual components of the CVR disease complex are significantly affected. On the other hand, most of the shifts are within the CVR system, and mortality data for all CVR diseases are probably relatively free from complications resulting from these changes in concept.

A number of studies have explored the accuracy of cause-of-death statements on death certificates (*5–7*). On the basis of comparisons between clinical and pathological records, the diagnostic statements relating to CVR diseases have been found in these studies to be relatively poor. Those investigations which utilize autopsy findings as the standard of reference have serious limitations. For example, diagnoses of clinical entities cannot always be established by autopsy findings. In the study of James and associates (*7*), the use of autopsy data decreased the proportion of deaths attributed to such causes as diabetes and hypertensive diseases and increased the proportion attributable to arteriosclerosis.

Deaths of patients in hospitals tend to be weighted with surgical cases, acute illnesses, and diseases and conditions relatively difficult to diagnose. Pathological findings are sought more often for deaths where the clinical diagnosis is not clear or where diagnostic confirmation is desired. Thus, the selection of deaths in hospitals, particularly deaths for which autopsies were performed, should lead to greater disagreement than would appear in a hypothetical situation where cause-of-death statements are compared with clinical or pathological findings.

Pennsylvania Study

In order to avoid the selective factors involved in the study of hospital deaths that come to autopsy, the medical certifier was queried in a sample of death certificates issued in hospitals for a 3-month period in 1956 in Pennsylvania. The methodology and results of this study were published recently (*8*). Briefly, the method of study was to send a questionnaire to the physician signing the death certificate asking for information on diagnostic methods, the pertinent findings on which the medical certification of death was based, and an expression of his certainty of the diagnosis on the medical certification. The returns were reviewed by an internist and rated as to quality (type and amount) of supporting

Table 2. Quality (type and amount) of supporting diagnostic information on cardiovascular-renal diseases, Pennsylvania mortality sample, 3-month period, 1956 [1]

Major cardiovascular-renal diseases	Total number	Percent			
		Very good	Good	Sketchy	No report
Total	1,406	28.7	19.8	47.4	4.1
Intracranial lesions of central nervous system	254	20.9	23.2	51.2	4.7
Rheumatic fever and rheumatic heart disease	41	58.5	19.5	14.6	7.4
Arteriosclerotic heart disease including coronary disease	692	29.8	17.6	49.0	3.6
Other heart disease, except hypertensive disease	167	17.4	16.2	64.1	2.3
Hypertensive diseases	150	30.7	27.3	36.0	6.0
Other cardiovascular-renal diseases	102	45.1	21.6	29.4	3.9

[1] Totals adjusted to number of deaths in current mortality sample.

diagnostic information and consistency of medical certification with the diagnostic evidence. Also, the reviewing internist rated his impression of certainty of the diagnosis.

The findings on CVR diseases may be summarized as follows:

1. A relatively large proportion (47 percent) of the available diagnostic information on CVR diseases was sketchy (table 2); in 20 percent, it was "good;" and in 29 percent, "very good." In 4 percent, there were no returns on which to make an assessment.

2. Analysis of evidence presented in 1,406 deaths in support of a diagnosis of the major CVR diseases judged the certified diagnosis most probable in 78 percent of the deaths, another diagnosis equally probable in 14 percent, and a different diagnosis preferred in 3 percent (table 3). No diagnostic information was available in the remaining 4 percent. These figures may to some degree understate the quality of medical certifications of deaths from CVR diseases since judgments were made on the specific diagnoses reported. Some classified as "another diagnosis equally probable" or "another diagnosis preferred" could well have been the "most probable diagnosis" had the cause-of-death statement referred to another related disease within the cardiovascular-renal system. With respect to the specific diagnoses, the proportion of medical certifications judged to be the "most probable diagnosis" ranged from 67

Table 3. Consistency of medical certification with diagnostic evidence on cardiovascular-renal diseases, Pennsylvania mortality sample, 3-month period, 1956 [1]

Major cardiovascular-renal diseases	Total number	Percent			
		Most probable diagnosis	Another diagnosis equally probable	Another diagnosis preferred	No diagnostic information
Total	1,406	78.2	14.4	3.3	4.1
Vascular lesions of central nervous system	254	85.0	8.7	1.6	4.7
Rheumatic fever and rheumatic heart disease	41	82.9	9.8	0	7.3
Arteriosclerotic heart disease including coronary diseases	692	78.6	16.5	1.3	3.6
Other heart diseases, except hypertensive	167	66.5	19.8	11.4	2.3
Hypertensive diseases	150	76.0	16.0	2.0	6.0
Other cardiovascular-renal diseases	102	78.4	5.9	11.8	3.9

[1] Totals adjusted to number of deaths in current mortality sample.

percent for "other heart diseases, except hypertensive" to 85 percent for the vascular lesions affecting the central nervous system.

3. The reviewer's evaluation of the diagnostic information on deaths certified by physicians indicated that diagnosis was solidly established in 33 percent of the CVR deaths, and reasonably well established in 47 percent of the deaths (table 4). In other words, in 80 percent of the deaths from CVR diseases, the diagnoses were evaluated to be reasonable or better. There was more uncertainty concerning the accuracy of diagnoses of deaths from hypertensive diseases and the residual group of CVR diseases. The query form was probably weakest in eliciting clinical evidence which, in part, may account for the lower proportion of solidly established and reasonable diagnoses for these rubrics.

4. A relatively large proportion (15 percent) of deaths from CVR diseases in Pennsylvania was certified by the medical examiner or coroners. This proportion was much higher (31 percent) for coronary heart disease, which is frequently linked with sudden death. The care with which the medical examiner and coroners discharge their legal responsibilities can significantly affect statistics for CVR disease mortality. In Pennsylvania, at least, the coroners or medical examiner often consult the family physician, if there is one, before making out the medical certificate, or, if the reasons for death seem unclear, an autopsy is ordered.

5. The differences in diagnostic quality do not appear to be important factors in the interpretation of sex and age differentials, in the more usual situation where the interest is in reasonable diagnosis or better.

6. Data by place of residence of the decedent showed slight differences by population size; but these do not seem large enough to account for much of the observed urban-rural differences in mortality.

7. There seemed to be a marked urban-rural difference in the quality of diagnoses according to the physician's place of practice. About 80 percent of the diagnoses of urban medical practitioners were rated as "solidly established" or "reasonable," while 70 percent of the diagnoses of their rural colleagues fell into those categories.

The establishment of an adequate diagnosis is important, but for the purposes of mortality statistics, diagnostic information must also be reported properly on the death certificate. This requires a complete statement of the judgment of the medical certifier on the sequence of events leading to death, in unambiguous medical terminology. Unless all of the pertinent facts are reported completely in the proper sequence, accurate and consistent classification becomes difficult.

In the Pennsylvania study, the diagnostic information on CVR diseases was reported "completely" by physicians on 84.7 percent of the death certificates (table 5). On 11.8 percent, the medical certification was incomplete in some respects. For example, an intervening

Table 4. Reviewers' evaluation of diagnostic information on cardiovascular-renal deaths certified by physicians, Pennsylvania mortality sample, 3-month period, 1956 [1]

Major cardiovascular-renal diseases	Total number	Percent			
		Solidly established diagnosis	Reasonable diagnosis	Diagnosis in doubt	Diagnosis probably wrong
Total	1, 194	32. 8	46. 5	10. 3	6. 0
Vascular lesions of central nervous system	236	31. 8	53. 8	7. 2	2. 1
Rheumatic fever and rheumatic heart disease	38	58. 0	23. 7	7. 9	2. 6
Arteriosclerotic heart disease	260	30. 0	51. 9	9. 2	3. 5
Heart disease specified as involving coronaries	271	39. 1	45. 0	10. 7	3. 0
Hypertensive diseases	128	32. 8	40. 6	16. 4	3. 1
Other cardiovascular-renal diseases	261	26. 4	42. 1	11. 1	17. 2

[1] Total adjusted to number of deaths in current mortality sample. Deaths with no reported information are included in the total but not distributed in the percentages shown.

Table 5. Percent completeness of medical certifications of cardiovascular-renal diseases, Pennsylvania mortality sample, 3-month period, 1956 [1]

Major cardiovascular-renal diseases	Physicians' returns					Medical examiner's and coroners' returns				
	Total number	Percent				Total number	Percent			
		Complete	Incomplete	Grossly incomplete	Incorrect		Complete	Incomplete	Grossly incomplete	Incorrect
Total	1,142	84.7	11.8	1.9	1.6	206	70.4	26.2	1.0	2.4
Intracranial lesions of central nervous system	224	91.5	7.6	0	.9	18	66.7	33.3	0	0
Arteriosclerotic heart disease including coronary diseases	511	88.3	10.6	0	1.2	156	67.9	29.5	1.3	1.3
Other heart diseases, except hypertensive	191	72.3	16.8	9.4	1.6	10	100.0	0	0	0
Hypertensive diseases	119	87.4	12.6	0	0	19	89.5	10.5	0	0
Other cardiovascular-renal diseases	97	71.1	17.5	4.1	7.3	0	-------	-------	-------	-------

[1] Totals do not include reports on which diagnostic information not received and not adjusted to number of deaths in the current mortality sample.

cause in the sequence of events was omitted. A few, 1.9 percent, were grossly incomplete. On 1.6 percent, the diagnostic information was judged to be reported incorrectly. As might be expected, the proportion of medical certificates completely reported by the medical examiner and coroners was lower (70.4 percent). However, the proportion adjudged grossly incomplete and incorrect did not differ significantly from that for reports by private physicians.

The reporting of sequence of events was generally good, despite the difficulties involved in determining the relationship between the various components of CVR diseases. As may be seen in table 6, about 94 percent of the certifications of CVR diseases by physicians represented correct or substantially correct sequence. The terminology used was also generally good, except in the group categorized as "other diseases of the heart, except hypertensive." Here the persistent use of the obsolete term "chronic myocarditis" resulted in a high proportion of reports by certifying

Table 6. Percent of cardiovascular-renal disease reported by physicians in proper sequence of events using good or bad terminology, Pennsylvania mortality sample, 3-month period, 1956 [1]

Major cardiovascular-renal diseases	Total number	Correct sequence			Substantially correct			Incorrect sequence		
		Total	Good	Bad	Total	Good	Bad	Total	Good	Bad
Total	1,142	90.5	84.1	6.4	3.4	2.5	0.9	6.0	5.1	0.9
Intracranial lesions of central nervous system	224	94.3	90.2	4.1	2.2	1.8	.4	3.6	3.6	0
Arteriosclerotic heart disease including coronary diseases	511	89.9	86.0	3.9	4.5	3.5	1.0	5.7	4.9	.8
Other heart diseases, except hypertensive	191	86.6	67.5	19.1	5.2	3.1	2.1	7.4	5.8	1.6
Hypertensive diseases	119	92.4	88.2	4.2	0	0	0	7.6	4.2	3.4
Other cardiovascular-renal diseases	97	91.8	91.8	0	0	0	0	8.2	8.2	0

[1] Totals do not include reports on which diagnostic information not received, and not adjusted to number of deaths in current mortality sample.

physicians being cited by the reviewer as poor terminology. In Pennsylvania, the reporting of CVR diseases by medical examiner and coroners does not appear to present much of a problem. This may not be the case in other parts of the country.

The medical certifier provides the information which forms the basis of cause-of-death statistics. For statistical purposes this information is classified according to certain prescribed rules, by the current categories of the International Lists of Diseases and Causes of Death. For primary mortality tabulations, it is necessary to select a single cause which is presumably the disease or condition which initiated the train of events leading to death. In CVR diseases, the cause so selected is frequently modified by the special provisions in the classification. Thus, data on certain presumptive etiological factors are lost. For example, "cerebral hemorrhage due to hypertension" is classified as intracranial lesions of vascular origin, and the presence of hypertension does not appear in the tabulations.

The problems of classification have been described elsewhere (*9–13*). Aside from the difficulties in adequately characterizing the diseases of the CVR system by selecting a single underlying cause, the decennial revisions of the international lists limit severely the compilation of a comparable series of statistics for the specific components of the CVR diseases. However, in view of the fact that revisions of the classification generally entail further subdivisions of CVR diseases and transfers within the CVR system, comparability of statistics for all CVR diseases has not been affected materially over the years.

Conclusions

The situation with respect to the interpretation of CVR disease mortality statistics in the United States appears to be as follows:

1. Available data on the accuracy of diagnosis and of medical returns on death certificates are fragmentary and have certain limitations. The relative dearth of good supporting diagnostic information appears to be a problem in CVR mortality, but the Pennsylvania study suggests that the quality of diagnosis as reported on death certificates is for the most part reasonably good or better.

2. The universal adoption of diagnostic criteria such as those of the New York Heart Association (*14*) would materially improve the diagnostic information on death certificates. However, absolute and unfailing accuracy of diagnoses is unattainable. The etiological and pathological relationships in CVR diseases are often complex, and there is little opportunity for the medical certifier to make a thorough antemortem examination in a large proportion of deaths, say from coronary disease, because the patient dies suddenly.

3. Despite the various shortcomings of mortality data for the specific components of CVR diseases, data for the total complex of CVR diseases appear reliable for interpretation of mortality trends. More information is needed on a national scale and further work should be done to explore the factors of geographic distribution.

4. Because of the periodic revisions in classification, the study of the course of mortality of the components of CVR diseases will have to be limited necessarily to short-run analyses.

5. There should be a more general recognition that mortality data are not precise measures, but that in epidemiological studies they are useful in suggesting leads to be elaborated by other study approaches.

6. Preparatory work is now underway for the 8th revision of the International Lists of Diseases and Causes of Death. It is expected that the classification will provide for a greater number of disease complexes in the section on diseases of the CVR system. This will eliminate some of the troublesome factors in satisfactorily characterizing CVR diseases now encountered in primary mortality tabulations. However, it will not be possible to identify all the significant relationships. For this purpose, there will be a need for multiple-cause tabulations.

7. There has been a growing interest in studies of CVR disease mortality on an international scale involving various ethnic groups, in order to identify some of the etiological factors. A study group of the World Health

Organization is now developing diagnostic criteria for international use. Continuing interest in this area should be helpful in improving CVR disease mortality statistics.

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World Health Day, April 7

The theme of World Health Day 1960, observed each year on April 7, is "Malaria Eradication—A World Challenge."

The Public Health Service will supply, upon request, program materials and background information on the World Health Organization, the history and current status of malaria throughout the world, and the progress which has been made in the worldwide malaria eradication effort. The Public Health Service also has an International Health Speakers' Bureau which includes prominent individuals throughout the United States who have been active in international health affairs and who have indicated their willingness to speak on World Health Day programs.

Requests for this material, or for other specific information about international health organizations or United States participation in international health programs, should be directed to the Assistant to the Surgeon General for International Health, U.S. Public Health Service, Department of Health, Education, and Welfare, Washington 25, D.C.

April 7 is the anniversary of the day on which the World Health Organization came into being. WHO, established in 1948, is one of the specialized agencies of the United Nations, with membership of 90 countries.

Assay of Tests for Syphilis on Unheated Serum

HILFRED N. BOSSAK, B.S., WILLIAM P. DUNCAN, B.S., AD HARRIS, and VIRGINIA H. FALCONE, B.S.

A METHOD for testing unheated serum in the same manner as plasma in the rapid plasma reagin (RPR) test (*1*) has recently been reported in which the comparative results obtained with this method and several other procedures on specimens from a serologic survey conducted in North Carolina, are described (*2*). An earlier method employing measured amounts of unheated serum and RPR antigen suspension, and referred to as the unheated serum reagin (USR) test, was included among the nontreponemal tests performed in the SERA study (*3*).

The establishment of a serum bank of clinically categorized donors at this laboratory has been previously described (*4*). Its availability has made possible the rapid assay of newly published procedures, and it has again been used in this study.

This report presents the comparative results obtained with the two procedures performed on unheated serum and the VDRL slide test on serums from medically defined patient groups.

Materials and Methods

The rapid plasma reagin test on unheated serum (RPR–US) was performed in exactly the same manner as the RPR test (*1*) except that serum was substituted for plasma.

The unheated serum reagin test was performed according to the technique described in the SERA study (*3*).

The VDRL slide test was performed in accordance with the technique described in the Manual of Serologic Tests for Syphilis, 1959 revision.

All tests were performed at the Venereal Disease Research Laboratory, Chamblee, Ga. VDRL slide test results on those serums that were included in both the SERA study and the serum bank were taken from the SERA study report. The two tests on unheated serum were run on all the specimens at a later date. VDRL slide tests were performed at the same time on any specimens added to the bank which had not been included in the SERA study.

The donors of the serums tested were in the following categories:

Presumed Nonsyphilitic

- Apparently healthy donors presumably with no history of previous or present infection with syphilis.

Syphilis

- Donors with primary syphilis proved by darkfield examination, who had not received treatment.
- Patients having had primary syphilis proved by darkfield examination and who had adequate treatment with 2,400,000 units or more of penicillin not less than 2 nor more than 4 years prior to time blood was taken.
- Donors with secondary syphilis proved by darkfield examination, who had not been treated.

Mr. Bossak, Mr. Duncan, and Mrs. Falcone are bacteriologists with the Venereal Disease Research Laboratory, Communicable Disease Center, Chamblee, Ga., of which Mr. Harris is director. (Manuscript received for publication September 25, 1959.)

• Patients with secondary syphilis proved by darkfield examination who had adequate treatment with 2,400,000 units or more of penicillin not less than 2 nor more than 4 years prior to time blood was taken.

• Donors with either latent or late syphilis, adequately treated with 4,800,000 units or more of penicillin.

With Conditions Other Than Syphilis

• Hospital patients with a variety of diseases or conditions, not receiving antibiotics and having no history of clinical evidence of syphilis; patients 12 years of age or younger with yaws; patients with pinta, below age at which associated syphilis might be expected; and leprosy patients not thought to have associated syphilis.

Biologic False Positives (BFP)

• Patients with reactive nontreponemal tests, at least one nonreactive (TPI) *Treponema pallidum* immobilization test, and no clinical evidence of syphilis.

• Patients with reactive nontreponemal tests, no previous TPI test, and no clinical evidence of syphilis.

Results

The results obtained with the three procedures on 592 serums from presumed nonsyphilitic persons are shown in table 1. Of the total number of serums tested, 329 were residuals of SERA study specimens which had not been previously heated or tested and had been stored in the frozen state in tightly sealed containers since the original date of collection and separation of the serum. The remaining 263 specimens were obtained from other sources and were added to the serum bank at later dates. Regardless of the origin of the serums, however, absolute agreement was obtained with the unheated serum reagin and the rapid plasma reagin test on unheated serum. Percentage reactivity was identical with all three tests (0.34 percent), although the two serums which reacted in the tests with unheated serum were not the same serums that were reactive in the VDRL slide test. The *Treponema pallidum* immobilization test, performed in this laboratory on these four specimens, was reactive in each instance, suggesting a treponemal infection, past or present.

Table 2 lists the results obtained in six clini-

Table 1. Results with 592 serums from presumed nonsyphilitic persons

Test	Nonreactive		Reactive [1]		Total	
	Number	Percent	Number	Percent	Number	Percent
Unheated serum reagin	590	99. 66	2	0. 34	592	100
Rapid plasma reagin on unheated serum	590	99. 66	2	. 34	592	100
VDRL slide	590	99. 66	2	. 34	592	100

[1] Reactive plus weakly reactive.

Table 2. Reactivity rate [1] in six clinically defined categories of syphilis

Category	Number of specimens	USR test		RPR-US test		VDRL slide test	
		Number	Percent	Number	Percent	Number	Percent
Primary, untreated	119	85	71. 4	86	72. 3	79	66. 4
Primary, treated	29	4	13. 8	4	13. 8	0	0
Secondary, untreated	98	98	100. 0	98	100. 0	98	100. 0
Secondary, treated	18	8	44. 4	8	44. 4	5	27. 8
Latent, treated	25	23	92. 0	23	92. 0	17	68. 0
Late, treated	203	190	93. 6	191	94. 1	178	87. 7

[1] Reactive plus weakly reactive.

Table 3. Reactivity rate [1] in conditions or diseases other than syphilis

Category	Number of specimens	USR test		RPR-US test		VDRL slide test	
		Number	Percent	Number	Percent	Number	Percent
Conditions other than syphilis	73	7	9. 6	7	9. 6	4	5. 5
Biologic false positive, nonreactive TPI test	111	53	47. 7	53	47. 7	54	48. 6
Biologic false positive, no TPI test	109	55	50. 5	55	50. 5	48	44. 0

[1] Reactive plus weakly reactive.

cally defined syphilis categories. Little difference was noted in the reactivity rate of the two tests on unheated serum although the RPR test appeared to be slightly more reactive than the procedure using measured amounts of reagents. Both tests were more reactive than the VDRL slide test in all categories except untreated secondary syphilis. In adequately treated primary, secondary, and latent syphilis, the lower reactivity rate of the VDRL slide test was most apparent, suggesting a more rapid reversion to nonreactivity after treatment.

Findings with the three procedures in conditions or diseases other than syphilis are summarized in table 3. With conditions other than syphilis the incidence of reactivity with the two tests on unheated serum was approximately twice that of the VDRL slide test. Results obtained with all three tests were approximately the same in one biologic false positive category, composed of serums from persons who had been screened with at least one nonreactive TPI test. None of the patients in the second BFP category had been previously tested with the TPI. In this group, the VDRL slide test was less reactive than the two procedures performed on unheated serum.

Summary and Conclusions

The comparative results obtained with the unheated serum reagin test, the rapid plasma reagin test on unheated serum, and the VDRL slide test on serums from medically defined patient categories are presented.

1. No significant differences were observed between the two tests on unheated serum.

2. Percentage reactivity was the same with all three procedures in the group of healthy, presumedly nonsyphilitic persons.

3. In serums from donors with syphilis, the two procedures with unheated serum were more reactive than the VDRL slide test in all categories except secondary, untreated, including those patient groups who had received adequate treatment.

4. The unheated serum reagin test and the rapid plasma reagin test on unheated serum were almost twice as reactive as the VDRL slide test in the category of patients with diseases other than syphilis.

5. The results obtained with the three procedures were quite similar in the two groups of patients classified as biologic false positive reactors.

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APHA Conference Report

SUMMARIES OF SELECTED PAPERS
from the 87th annual meeting
of the
AMERICAN PUBLIC HEALTH ASSOCIATION
and related organizations
held at Atlantic City, N.J.
October 19–23, 1959

THE APHA CONFERENCE REPORT

With the assistance and cooperation of the authors, the staff of *Public Health Reports* has summarized roughly four-score papers presented at the 87th annual meeting of the American Public Health Association and related organizations, in Atlantic City, October 19–23, 1959.

The objectives of this annual summation are to touch bases for the members of the conference who found it physically impossible to make the rounds of every meeting in which they were interested; to present in a single package many of the major topics presented at the conference; to permit those unable to attend the conference to obtain a wide-screen view of developments in public health work; and to provide authors of papers with an opportunity to reach a broad professional audience, with at least a summary of their information, in anticipation of the usual course of publication.

This summation has been a bit more eclectic than usual. As the American Public Health Association plans to publish in three separate supplements to its journal papers presented by foreign guests of the conference, papers on heart disease, and papers dealing with behavioral sciences, few if any of those papers are represented here.

Certain other papers were passed by because they did not lend themselves to treatment in this collection, or because they are now in print in full. Many interesting talks given at the conference are not carried here because the authors either spoke without reference to a text or did not provide copy for *Public Health Reports*.

This summation is prepared at the invitation of the American Public Health Association. For further details on the papers touched upon, readers are advised to communicate with the authors. Many of the papers presented to the conference, whether or not they are mentioned here, remain under consideration for full publication in professional journals in the near future.

The next annual conference is scheduled for October 31 to November 4, 1960, in San Francisco.

Public Health Trends . . .

Mene Mene Tekel Ufarsin Decoded

A willingness to meet the inevitable halfway was recommended by Elton D. Woolpert, assistant to the Surgeon General, Public Health Service, as the appropriate response to changes portended by the modern handwriting on the wall which he discerned in statistics of social trends.

Predicting a high rate of obsolescence of plans to meet the future, he advocated anticipating imminent changes with new methods, well tested and thoroughly developed by public health research and demonstration. The alternative he left to the imagination.

Among emerging stresses which are on the point of producing intolerable social strains, he mentioned the following:

Personnel needs: The demand for physicians alone, he asserted, calls for founding at least one new medical school a year for the next 15 or 20 years, if only to keep the present proportion of medical services.

Facilities: The number of beds and other accommodations needed to provide for the aged and chronically ill is not keeping pace with the increase of the aged population.

Government: Local governmental structures of the past are ill-suited to the management of urban complexes, with their interrelated systems of recreation, education, medical care, transportation, water supply, and waste disposal.

Services: Present jurisdictional lines are ill-suited to administering related public services. What is needed is "not so much new boxes on the organization charts" as new patterns of services meaningful to the public.

Taxation: Dependence on property taxes, inadequate assessment of real property taxes, and rigid tax and debt limit are serious obstacles to adjustment of public service and construction programs to meet needs of a growing population in a period of rising prices.

Urban representation: With State legislatures elected to serve a population pattern of 1900, rather than the dominantly urban pattern of the present, municipal officials, hampered also by limits on powers to tax or incur debt, are obliged to seek direct assistance from the Federal Government for community services.

Research: Public health administration, facing new challenges with the encumbrance of archaic and impoverished institutions and methods, lags notably in obtaining studies which will appraise its needs and which may devise methods of adjusting present facilities or creating new approaches.

In conclusion, Woolpert observed that his efforts at translating the handwriting on the wall were by no means complete, that others for years to come will have the pleasure of continuing in that occupation.

Private Physicians Aid City Services

Foreign visitors to the APHA conference, so accustomed to governmental management of health services that they can hardly conceive of private support of public health facilities, went through a mental earthquake as they heard a description by Dr. Harry S. Lichtman and Simon Podair of the work of the public health committee of the medical society of the County of Kings, New York City. Dr. Lichtman is chairman of the committee.

Members of the committee include general practitioners and many specialists, including the authors of the report, both employed by the New York City Department of Health. Lichtman is borough chief of Brooklyn in the bureau of preventable diseases, and Podair is coordinator of health education for the borough. Nonmedical specialists are invited to sit with the committee as consultants.

In 1956, the committee threw its full resources into a drive for Salk vaccine inoculations against poliomyelitis in parochial schools and child care centers. This program broadened into a drive for mass immunization of adults, which entailed free services by members of the medical society, using vaccine contributed by tax-supported agencies.

A second effort of the committee has been directed at enlisting the efforts of private physicians in improving public knowledge and attitudes toward questions of health, through private conversations with patients. The committee supplies physicians with information on developments in health matters of public interest and encourages physicians to supply patients with effective answers to quackery, sensationalism, superstition, and misinformation.

One device for encouraging the transmission of such information has been a series of public forums called "Twelve Wednesdays for Your Health." Although only 400 are seated in the lecture hall where the issues are discussed, the program is publicized to 15,000 members of the institute, and the proceedings are reported in the New York press.

Voluntary associations collaborate in these forums, to the extent they are directly concerned. They put up exhibits, supply literature, and offer information on the spot.

Some of the lectures given at these meetings have been published in the *New York State Journal of Medicine*, although they were prepared originally for information to a lay audience.

The success with the forums led to a radio program for a local audience, which has since been transcribed and broadcast by the Voice of America. The series of radio interviews has been taped and rebroadcast by the station, WEVD.

Because of controversies on public health procedures, initiated by cultists, the committee arranged with newspaper publishers to prepare answers to attacks on fluoridation, poliomyelitis immunization, and other public health programs. It has also prepared a weekly health column for publication in the Brooklyn press.

A speakers' bureau was organized by the committee in response to a great demand for qualified speak-

ers from parent-teacher associations, churches, centers for the aged, settlement houses, and other institutions. A panel was organized by the committee from members of the medical society. Names are forwarded when requests are made by either community organizations or the health department. The services of the speaker are reported in the bulletin of the medical society.

A subcommittee on mental health has been organized. One of its prime objectives is to improve the psychiatric training of the nonpsychiatric physician. In cooperation with the Kings County chapter of the American Academy of General Practice, seminars are conducted under direction of one psychiatrist, with six to eight participating physicians. The method has been so well received that several hospitals are experimenting with it for postgraduate training. In December 1959 the U.S. Public Health Service gave the subcommittee on mental health a grant of $51,840 for 3 years, for the education of the nonpsychiatric physician.

Periodic physical examinations of physicians were organized by the committee, utilizing facilities of four civic health centers in Brooklyn. More than 200 physicians have been examined.

A recommendation of the committee, urging footprints of infants and fingerprints of mothers for purposes of identification, has become a requirement of the New York City Health Code.

A directory of medical and social services which physicians may use in counseling patients is the latest project of the committee.

The committee has also prepared and released more than 12 reports on issues of public health significance, such as employment of hospital epidemiologists.

Land Competition Becomes Planned

The ancient competition for land, once a simple preoccupation of militant farmers, hunters, trappers, cattlemen, sheepherders, miners, merchants, and robber barons, has become refined. As described by B. Budd Chavooshian, chief of the New Jersey State Planning Bureau, the hurlyburly of the battlefield has settled down to a spell of fretting at the drawing board, murmuring at conference tables, and activity at the polls.

Land uses for each individual, neighborhood, and business have become so complex and interrelated that internal conflicts, according to Chavooshian, have virtually imposed upon entire regions demands for planned land use which frequently become issues for political action.

Planning for land use, as he describes it, consists of preparing reports, maps, and charts describing present and prospective uses of land in relation to needs; designing effective means for moving freight and passengers; and assuring space for recreation, educational facilities, and public utilities.

Private interests in land use are classified by planners into residential, commercial, and industrial users, each with special requirements as to location and facilities. He recommended also that land-use plans pay regard also to the conversion of land for agriculture, in view of the fact that builders of roads, housing, industrial plants, and other urban facilities are gobbling up 3,000 additional acres of open land every day.

Instruments of executing land plans mentioned by Chavooshian, apart from such traditional means as credit, include zoning and building regulations, ordinances regulating subdivisions, and urban renewal programs supported by Federal funds.

As examples of communities which have serious planning programs underway, Chavooshian briefly mentioned Toronto, Canada, Dade County (Miami), Detroit, and the Twin Cities of Minnesota, Minneapolis and St. Paul.

The State Planning Bureau in New Jersey, he said, is one of the few agencies to set up planning services for a long list of communities. Master plans for 60 of 120 communities receiving these services have been completed with regard to needs of adjacent areas, and plans for 15 others were nearly completed last fall. Over 40 additional municipalities have applied for similar planning assistance. This program is undertaken under the provisions of section 701 of the Federal Housing Act of 1954, as amended. The agency also has an urban renewal survey underway in 278 municipalities comprising 9 counties in the northeastern portion of the State. This survey is financed in part by the Federal Government under the provisions of section 314 of the Housing Act of 1954.

In meeting the problem of land development, the bureau has also initiated a broad base State planning program, including capital improvements programing.

The Doctor's Dilemma: Panic or Prevention

As one more piece of historical evidence, the case of the fresh flounder tainted with sodium nitrite was reported by Dr. Morris A. Shiffman, Dr. Milton Werrin, and Dr. Sylvan Fish, of the Philadelphia Department of Health, to illustrate the delicate task of a health department in protecting the public without wreaking havoc. The authors are chiefs, respectively, of milk and food, veterinary public health, and communicable disease sections of the department.

The flounder outbreak struck shortly before Good Friday last year. With one child dead from sodium nitrite poisoning, the department took emergency measures to detect the source, alert the public, and recall shipments which might have affected as many as 4,000 persons. The preventive action was on the whole successful. At the same time, hundreds sought medical aid unnecessarily; unknown quantities of harmless fish were discarded; and sales of seafood in Philadelphia, dropping immediately to 10 percent

of normal, did not recover completely for several months.

Within 20 hours after receiving the first word that a family had suffered food poisoning, originally thought to be botulism, the Philadelphia Health Department, the New Jersey State Health Department, the New Jersey State Police, and the Food and Drug Administration had determined that an unknown quantity of flounder containing sodium nitrite had been distributed in the area. The time was shortly before the dinner hour, barely enough to meet the 5 o'clock deadline of the evening papers.

Under the circumstances, say the authors of the report, there was no time for preparing "a carefully worded press release." Newspapers and radio stations were notified orally by the press officer of the department. That night, one headline read, POISON FISH FLOODS AREA. TV and radio programs were interrupted to issue warnings which were repeated at 15-minute intervals. Later, these media announced antidotes, recommended by the Philadelphia Health Department for those who experienced symptoms of poisoning following a meal of flounder.

Meanwhile, the source of contaminated flounder had been identified. Police on foot and in radio cars carried warnings to all possible distributors. In suburban and rural areas, police broadcast warnings by loudspeaker. They also put out an announcement on a 14-State teletype network, reaching well outside the market area, to the distress of adjacent distributors of seafood.

The public response may be judged by the fact that the municipal switchboard handled 20,000 calls on the night of the alert. Additional thousands of calls were directed to hospitals and physicians. At the health department office, these calls were answered by reading of a prepared statement by operators who stayed on duty far beyond the normal working period.

Reflecting on these events, the authors are uncertain that the announcement could have been issued with a greater degree of discretion. The nature of the news itself, they feel, more or less determined its treatment and the public response.

Although Philadelphia Health Department officials are in 24-hour contact with the municipal radio dispatcher for emergency calls, and although the department has a poison control center operating 24 hours a day, the officials feel it might be desirable to have a 24-hour emergency service in the department, with one trained person on hand at all times to issue information and direct emergency actions.

State Consultation Raises Hospital Standards

A hospital consultation program in a State health department can provide many varied services to hospitals and help assure the best possible quality of patient care, according to Dr. Goldie B. Corneliuson, director of the maternal and child health division, and Dr. Fanny H. Kenyon, chief of the hospital consultation and licensing section, Michigan Department of Health.

Such a program, they pointed out, requires teamwork of the highest order, and mature personnel who will learn as well as teach. Consultation services are usually given by a relatively small team assigned full time to the hospital program, supplemented, as needed, by specialists such as epidemiologists, pediatricians, and obstetricians, laboratory scientists, dietitians, ventilation and radiological engineers, and statisticians, whose responsibilities include but are not limited to service to hospitals.

The Michigan consultation team is directed by a physician, and includes four nursing consultants, two part-time sanitary engineers, and two clerks. Corneliuson and Kenyon stressed the importance of medical direction of the program, pointing out that a physician-director, preferably one with experience in private practice as well as public health, has both understanding of patient care and hospital problems and status with hospital administrators and staff. All the Michigan nursing consultants have had hospital supervisory experience and each has a master's degree in a different nursing specialty.

Michigan gives consultation to more than 260 hospitals and also to State mental hospitals and tuberculosis sanitoriums. Consultation is provided on such diverse matters as layouts of nurseries, maternity departments and kitchens, problems of central supply ventilation, help in developing obstetrical policies, educational programs, record forms, and the establishment of procedures and routines for brand new hospitals.

Aid is given also in emergencies. In cases of infection in a hospital, the department's epidemiologist heads the study team and has top priority on services of nursing consultants and sanitary engineers. When the infection is in a newborn nursery, the nursing consultant dons her uniform and often spends several days observing techniques on all shifts.

Licensing Responsibilities

In 1951, the responsibility for licensing hospitals with maternity departments was transferred to the Michigan Health Department from the Department of Welfare. The consultation staff was somewhat fearful, according to Corneliuson and Kenyon, that the new licensing operation might interfere with the excellent relationships it had established with hospitals. Instead, the licensing function has seemed to strengthen the consultation program and the department's years of experience with consultation have helped to play down the "policing from above" too often inherent in licensing programs, they reported.

With the assistance of hospital administrators, physicians, and nurses, the State developed higher hospital standards than it had originally thought feasible, Corneliuson and Kenyon stated. Only hospitals

approved and certified by the State health commissioner are eligible to receive payment for the care of public assistance recipients from Federal, State, and local funds.

Hospitals were given a reasonable time to comply with the regulations, with the health department providing advice and consultation on methods of meeting the requirements efficiently, economically, and practically.

Michigan's "Rules and Minimum Standards for Hospitals" now include 180 individual regulations, divided into three categories: those requiring immediate compliance, those requiring planned compliance, and a third group of undesignated rules which are to be placed in the immediate and planned categories at dates considered reasonable for the majority of hospitals.

In 1951, the first year of licensing, hospitals had only four so-called immediate compliance rules to meet in order to qualify for full licenses, yet only 56 percent were able to qualify. By 1959, with the immediate compliance list including 124 of the 180 rules, 90 percent of Michigan's hospitals qualified for full licenses.

The Michigan experience, Corneliuson and Kenyon said, has taught the State health department that:

Leaders among hospital administrators, practicing physicians, and nurses are eager to work with a governmental agency in development of standards which will be administered by the agency. Having shared in setting standards, they become the best interpreters of them.

It is more satisfying to the hospital and the health department when a hospital improves its practices or facilities as a result of good consultation or education rather than because of big stick action.

Community Mental Health Management Reviewed

To generate understanding of mental health in a community, professional personnel may well have a long, hard road to follow, Dr. Arthur J. Bindman and Dr. Lewis B. Klebanoff of the Massachusetts Department of Mental Health said, reporting on administrative problems inherent in establishing a community mental health program.

Although mental health is considered a virtuous and worthy cause, many varied attitudes are encountered. These attitudes must be understood and evaluated before professional personnel can work effectively for mental health in any locale, the authors stated. Goals cited for community leaders were the ability to see beyond individual interest in demands for service and to accept the limitations set by staff and budgetary boundaries.

Massachusetts was a pioneer, according to the authors, in establishing a mental health program based on local-State sponsorship of permanent mental health centers. This approach replaced traveling child guidance and school clinics, operating part-time on the local scene.

Community understanding, they said, may be encouraged by planned efforts in general mental health education, knowledge of the variety of services offered by a community mental health center, and promotion of support, both moral and financial. The authors urged emphasis on the partnership aspects of local and State participation and the use of the indirect approach in community organization.

A community mental health center, the authors suggested, can benefit from a clear pattern of communication and coordination between local and State departments; community acceptance through representation on advisory groups of organizations concerned with mental health; adequate financing; inservice training, standards, and salaries; and active relationships with schools and other caretaking agencies.

New Jersey

The role of the local health department in mental health, as explored in a 2-day workshop conducted by State and local agencies in New Jersey, was reported by two participants, Dr. Jesse B. Aronson, director of the division of local health services, State Department of Health, and Dr. V. Terrell Davis, director of the division of mental health and hospitals, State Department of Institutions and Agencies.

The workshop, requested by a group of New Jersey health officers, opened the door to active local health department participation in programs of prevention and control. The authors said all participants stressed the need for wider use of available services, either in modified or expanded form, in any attack on mental illness in the community.

In general, there has been a tendency to consider mental illness as separate and apart from other diseases, the authors observed, with the following results: Local health departments have not considered mental health a primary public responsibility. Popular understanding of mental illness is delayed. Existing community facilities are not used as effectively as desirable, and in fact are duplicated in some instances at additional cost to the taxpayer. And treatment services are emphasized rather than preventive measures.

The health officer, because of his accepted position in the community structure, can perform the urgently needed function of coordinating independent community mental health services with existing community services for the prevention and control of other diseases, the authors concluded.

Radiation Safety: The Inside Story

The significance of the ingestion of radioactive materials in the light of man's total exposure to ionizing radiation was discussed by James G. Terrill, Jr., assistant chief, Division of Radiological Health, Public Health Service.

Human exposure to the external and internal hazards of ionizing radiation results in somatic and genetic damage which may or may not be immediately apparent.

In order to judge the significance of radiation hazards and the control measures that are necessary, Terrill stressed the importance of the overall identification of sources and evaluation of exposures.

The cumulative effects of ionizing radiation are influenced by the half-life of the source and the nature of its emissions. Terrill indicated that other factors are involved including the total effects of a combination of internal emitters; the tendency of certain emitters to concentrate in specific tissues, organs, or locations; variability of effects with age; the question of linear versus threshold dose-effect relationships; and the uncertainty as to the distribution and movement of radionuclides through the environment, and through the human body.

With the increasing concern over the exposure of the general population to ingested radioactive material, Terrill noted that the need for radiation health standards applicable to this group is becoming more acute. The terminology of "maximum permissible concentrations," while applicable to occupational exposure, presents many difficulties in interpretation of the health significance of the levels of a mixture of fallout and reactor effluent which will be measured by the public health agencies.

Terrill stated that the question of standards for the general population was considered during the 1959 fallout hearings held before the Joint Committee on Atomic Energy—the conclusion being that "standards do not (and cannot) set a line which is 'safe' on one side and 'dangerous' on the other." In all exposures to ionizing radiation, he emphasized, there is a calculated risk.

Another difficulty he mentioned is the issue of deciding whether the standards should apply to population averages, to peak values for individuals as they do in occupational exposures, to individual materials, or to average diets.

Such issues, he concluded, explain the need for developing data on effects of radiation, methods of measurement, and total exposure as a guide to practical methods of control which may contain the risk with assurance and yet permit useful and beneficial applications of nuclear science.

Women Employees Affect Absenteeism Rates

Industry absentee rates and the shifting occupational distribution of women were discussed by Evelyn S. Spiro, labor economist with the Woman's Bureau, U.S. Department of Labor, in a review of the health and safety of working women.

The number of women workers in the Nation, more than 22½ million, may grow to some 32 million by 1975, predicted Spiro. Now they represent a third of the total work force, two-thirds of the clerical and more than half of the service workers, and almost all of the domestics. Although the professional and technical group has been growing at the most rapid rate, its proportion of women has declined. She believes that in the 1960's durable goods manufacturing will employ substantially more workers and the textile, tobacco, and leather industries, fewer. Among the women workers themselves, about a third are clerks.

Absenteeism data, though still fragmentary, in the opinion of Spiro, shows that time lost for job injuries is generally less for women than for men, but that women's frequency of nonoccupational disabilities is higher. The most days are lost for disability by the lowest income group. In a nationwide study of sickness absences of 5 consecutive weeks in cooperating establishments, frequency and duration rates increased by age for both sexes. The frequency rate for women was four-fifths higher than for men, with differences greatest in the 25- to 55-year age bracket. Among women, frequency was generally higher in manufacturing, in nondurables output, and among production workers rather than salaried. The average duration of these prolonged absences was 10½ weeks for women, about 2 days less than for men.

Spiro referred to a company study in which most sickness absenteeism was found to be among a few employees who were more discontented and prone to nervous and emotional disorders than others. Women averaged twice as many absences as men but of half the duration.

Fewer accidents occur in occupations and industries employing many women, said Spiro, except for some, such as poultry packing and certain other types of food processing, and in laundries and retail food stores. The average injury severity rate in 1956 and 1957 for apparel workers, mostly women, is the lowest in manufacturing.

In work such as canning and preserving, Spiro thinks that a high frequency of injury may be due partly to seasonal, short-term operations employing casual or inexperienced workers for long hours and deferring of repairs to the end of the rush season.

Attendants and food service workers were among those having the poorest safety records among hospital employees, who seem occupationally disposed to trunk injuries. Tuberculosis, viral infections, and skin disorders were the most common occupational diseases among hospital workers.

Men Report Less Illness Die Earlier than Women

That men run greater risk of life-endangering illness than women is suggested in a study reported by Dr. Lawrence E. Hinkle, Jr., associate professor of clinical medicine, Cornell University Medical College, New York City. Women may appear to have more illness, he said, because they report more minor illness than men do.

The study, in which Ruth Redmont, Norman Plummer, and Harold G. Wolff collaborated, was a project of the New York Hospital-Cornell Medical Center, covering disabling illness among 116 men and

96 women, New York Telephone Company employees, comparable in environment and other pertinent aspects, retrospectively for 20 years, and progressively for 5.

For both groups, the most frequent episodes concerned the respiratory and gastrointestinal tracts, muscular system, skin, eyes, and teeth. Men had a higher rate than women of such illnesses as pneumococcal pneumonia, pulmonary tuberculosis, and heart disease, bringing their death risk rate to a ratio of 4 to 3 for women.

More frequent illness episodes for women than for men may stem from culturally determined differences in attitude toward acceptable disability for the man and the woman, said Hinkle, conjecturing that, rather than being "unhealthy," women were more easily incapacitated but hardier. Further studies should "resolve the apparent paradox that mortality is inversely proportional to morbidity," he concluded.

The Viral Diseases . . .

Live Polio Vaccine Spreads Lightly

An experiment to test the communication of live poliomyelitis vaccine, undertaken in two Louisiana communities in June 1959, was the subject of a preliminary report by Dr. Henry Gelfand, virologist, Public Health Service; Louis Potash, virologist, Merck, Sharp and Dohme; and Dr. John P. Fox, professor of epidemiology, Dorothy R. LeBlanc, and Dorothy I. Clemmer, instructors in epidemiology, Tulane University Medical School.

A surprising finding was that, under apparently ideal conditions, the virus spread from vaccinated children to unvaccinated children only to a limited degree. Instead of "an explosion of transmission," the virus was isolated from only 58 percent of contact families, from 39 percent of susceptible contact children, and from 19 percent of immune contact children.

Moreover, many of the contacts excreted virus for so brief a period that they could hardly have served as effective sources for its spread, Gelfand said. He added that such infections may have failed to stimulate either antibody or local intestinal resistance.

At the same time, 90 percent of the children fed live vaccine orally excreted homologous virus, indicating the achievement of some immunity. Vaccine strains of all three types were provided by Dr. Albert Sabin from pools that had fulfilled his criteria for purity and attenuation. Because of the specific status of immunity in the communities studied, only type 3 was used.

No illness was observed to result from any of the infections.

In his discussion of the results, Gelfand observed that if these findings are confirmed by future experience, "concern with possible enhancement of the pathogenicity of the vaccine virus during human passage may be minimized." At the same time, he saw little hope of conferring immunity to an entire population by the seeding of only a part.

The failure of the vaccine strain to infect a larger proportion of the contact children he attributed in part to relatively low infectiousness of the vaccine strain, as compared with "wild" viruses, and in lesser degree to viral interference.

Polyvalent Vaccine Standards Stiff

A vaccine containing all known agents associated with acute minor respiratory diseases is neither practical nor scientific at present, declared Dr. John H. Dingle, professor of preventive medicine, Western Reserve University School of Medicine, Cleveland, Ohio.

He listed the following criteria to be met before any virus is incorporated into such a polyvalent vaccine used to immunize widely:

1. A clear demonstration that the virus causes the disease in question.
2. The disease is followed by immunity.
3. The virus can be grown in sufficient quantity to prepare a vaccine that effectively stimulates antibody.
4. A positive correlation exists between the presence of antibodies and resistance to infection.
5. Incidence of illness caused by the virus is great enough to warrant immunization on a broad scale.

Only the adenoviruses producing acute respiratory disease in military populations meet these criteria at present, he stated.

The acute minor respiratory infections with unknown causes constitute the bulk numerically of respiratory illnesses, Dingle said.

Of the 70 new viruses discovered in man in the past decade, nearly half were in the respiratory tract. Some have been identified as the cause of respiratory illnesses, some are associated with respiratory illnesses and also are present in apparently healthy persons, some appear to persist as latent agents in sites such as the tonsils and adenoids and play a minor role as provoking agents of disease, and others, seemingly unrelated to illnesses, have been termed "viruses in search of a disease."

At present, 18 types of adenoviruses have been isolated and more probably exist. The syndrome of acute respiratory disease in military recruits is caused principally by types 4, 7, and 14, and, to a lesser extent, by type 3. Aside from the outbreaks in summer camps and children's institutions characterized by pharyngitis, demonstrated to be caused by type 3, the importance of adenoviruses in causing disease in the civilian population is still uncertain, according to Dingle.

He described three new viruses, the parainfluenza viruses, in the

myxovirus group. Parainfluenza 1 virus was isolated in Sendai, Japan, from newborn infants suffering from viral pneumonitis; parainfluenza 2, from patients diagnosed as having croup.

Almost all adults have antibodies to parainfluenza 3, formerly known as hemadsorption virus type 1, but whether this virus produces clinical or subclinical infection has not been determined with certainty.

Among other viruses isolated are the chimpanzee coryza agent (CCA), found in certain cases of pneumonitis in infants and children, and the closely related 2060 and JH viruses, which are associated with mild respiratory illnesses.

Dingle concluded that knowledge of the causes of acute minor respiratory diseases is expanding and some semblance of order is emerging, although all the agents isolated account for only a relatively small proportion of the acute minor respiratory infections. He was confident that an important breakthrough has been made, and that the cause of the common cold, which occurs most frequently of all respiratory infections, will be found.

Mild Ills Offer Virus Clues

A mild febrile illness among families at the Great Lakes Naval Training Center in the summer of 1958 was investigated by Dr. Alfred D. Heggie, Dr. Irwin Schultz, Dr. Richard Gutekunst, Max Rosenbaum, and Dr. Lloyd F. Miller, attached to Naval Medical Research Unit No. 4.

Roughly a third of the families were affected by illness characterized by an upper respiratory infection and with associated gastrointestinal disturbances, enduring about 5 days, on the average. Fever and sore throat were the most frequent complaints. About a third of the patients reported headache and diarrhea. In a fifth of the patients, chest pains of a pleuritic nature were experienced.

The team found a "highly significant association of the occurrence of illness with the isolation of virus from throat and rectal swabs" and attributed the outbreak to infection with Coxsackie B2 virus.

Viral isolation was about the same in all children under 12 years of age in the community, but there was significantly less illness in those of the group above age 6. Both illness and isolation rates were relatively low among adults. The team suggested that previous experience with the virus in the older children and adults may have modified response to the virus.

Although none of the more serious illnesses associated with Coxsackie viruses were found, the team suggested that studies of outbreaks of nonspecific febrile illnesses may aid understanding of the communication of Coxsackie infections and their control.

Bird Fever Distribution Thwarts Epidemiology

The virus which produces psittacosis is so widely distributed and so infrequently destructive to a human host that it presents special difficulties for the epidemiologist, some of which were described by Dr. Rex E. Graber, district health officer in Wisconsin.

Following a 4-year study of employees in a turkey processing plant, he found that "a practical means of preventing infected birds from reaching the processing line is not apparent." Infections in birds, as well as in humans, are usually subclinical, he added, and there is no practical diagnostic method for screening carriers. "Serological study and virus isolation, at their best, are slow, tedious, expensive, not easily available, and not sufficiently sensitive," he said.

At the same time, he recalled that Texas studies failed to yield evidence that there was a health hazard from cooking or consuming turkeys which came from farms known to have harbored infective strains of high virulence and toxicity. That assurance was issued in 1954. Consequently, he felt that there was little hazard to consumers of turkeys from territories such as Wisconsin and Minnesota where the virulence of the strain is mild.

"Until control of the disease in the birds due to all strains is achieved," he said, "the first line of defense against the human hazard, in present day practice, must depend upon prompt recognition and treatment after the disease has been transmitted."

Usually, in Wisconsin, he said, physicians administer antibiotics early to patients acutely ill with symptoms and signs of respiratory infections. Such medication is effective against only a few of the primary causes of such symptoms, he added, but the physician also hopes by such treatment to prevent secondary infection. Tetracycline preparations have been found to be effective against the virus, but they also have the effect of preventing the production of detectable antibodies, with the consequent sacrifice of the opportunity of diagnosing the infectious agent.

Undoubtedly, he said, many sporadic cases of psittacosis from whatever source escape identification, and the number that might be associated with poultry is highly conjectural. Nevertheless, he believes there will remain ample opportunities for investigating this disease wherever birds are raised and processed in large numbers, unless by unforeseen methods the disease becomes controlled.

Need Way to Screen Rabies Immunity

Demonstrations of effective immunization against rabies still leave unanswered the question of identifying those who do not respond, according to Dr. R. L. Hectorne, veterinarian, Kentucky Health Department, and Dr. F. B. Peck, Jr., research associate, Eli Lilly and Company.

Using duck embryo for primary immunization, they determined that neutralizing antibody developed in a

majority of the subjects tested. Following the original 14-dose course, they found that only one or two booster shots seem necessary, once basic immunization has been established.

However, because of the few who fail to respond to immunization techniques, the authors refrain from offering a blanket recommendation for primary prophylaxis for rabies. Research is needed, they said, on a screening method to determine when immunization has been achieved.

Serum Sickness a Factor

When a patient develops serum sickness which is treated by corticosteroids in the course of administration of antirabies serum and vaccine, immunization may be defeated, in the opinion of Dr. Dorothy T. Magallon, on leave from the Kentucky State Health Department.

She had observed the usual incidence of serum sickness, about 20 percent, in 41 patients treated following bites by suspected rabid animals. In a group of 32 patients given antihistamines with the serum and vaccine, one developed serum sickness. Blood studies on these patients suggested that antihistamines might be used to offset serum sickness without interfering with antibody levels. However, antibody studies on the patient who developed serum sickness and received corticosteroids showed a total lack of response to vaccine. This suggests that patients who develop serum sickness may be exposed unwillingly to the hazards of both serum and vaccine without acquiring protection against rabies, although further research is needed to confirm this premise and to define more clearly the place for antiserum in rabies prophylaxis.

The best insurance against rabies or complications of antirabies therapy, however, she said, is the discerning physician who will weigh the risk of treatment against the probability of infection, considering circumstances of exposure, extent and location of the wound, behavior of the animal, and prevalence of rabies in the community.

Staphylococcus Control . . .

Operating Room Bacteria Controlled by Ventilation

Airborne infection of wounds during surgical operation is an appreciable hazard, declared Dr. Robert Blowers, director of the public health laboratory, General Hospital, Middlesbrough, England.

Reporting the results of air sampling during operations and sepsis records associated with them, Blowers said that when general bacterial counts were between 20 to 40 contaminated particles per cubic foot, the *Staphylococcus aureus* sedimentation rate was about 0.5 particles per square foot per minute. In operating rooms where efforts had been made to reduce airborne contamination, general bacterial counts were as low as between 1 and 2 particles per cubic foot, with the *S. aureus* sedimentation rate roughly 0.005 per square foot per minute, thereby reducing considerably the occurrence of sepsis.

However, Blowers pointed out, because it is still unknown whether the sepsis that does occur is airborne, more observations must be made before bacteriological standards of safety can be defined.

Bacteria in the air can be reduced effectively only when a good ventilation plant is combined with operating room discipline, he said.

Blowers suggested that the surgeon insist that no unsterilized blankets are brought into the operating room, that no street clothes or ordinary hospital uniforms be worn under gowns, and that no one enter or leave the room during an operation.

In the Middlesbrough public health laboratory, ventilation methods are being tested in a full-sized dummy operating room. Inflow of contaminated air has been prevented through the use of ports with weighted flap valves. When a door is opened and pressure in the room drops, these valves close and make the entire air supply available to give a strong outward draft through the door.

Blowers found that organisms inside the uniformly contaminated dummy room, where contamination arises below the table, are removed more rapidly by the downward displacement or "piston" method of ventilation than by other methods. This is effected by introducing clean air at the top of the room so that there is a minimum of mixing with the contaminated air which is removed by downward displacement. Also, fewer organisms are deposited on an exposed culture plate which represents the wound.

For an operating room, the best method of ventilation depends on exactly where organisms are discharged into the air. It is known, Blowers said, that few *S. aureus* are shed from the respiratory tract of nose and throat carriers and that many are shed from the skin and clothing of general skin and perineal carriers. What remains to be discovered, he suggested, is whether surgeons and nurses shed their *S. aureus* above or below the waist during their activities in the operating room.

Air Samples Measure Staph Contamination

The need for quantitative as well as qualitative analysis in studying the relation of the environment to hospital-acquired staphylococcal disease was stressed by Lawrence B.

Hall, chief of the Equipment Development Section, Communicable Disease Center, and Herbert M. Decker, chief of the Protection Branch, Ft. Detrick.

Many improvements have been made in sampling techniques, particularly in air sampling. The techniques should be used wherever possible, they said, in order to learn the extent of contamination.

Hospitals are usually concerned with the contamination of fomites. Although it is possible to estimate the quantity of contamination of a fomite, as well as its character, Hall and Decker cautioned that the quantitation is only relative, and the limitations of the procedures must be kept in mind.

The contamination of fomites is roughly similar to that of air and the degree of activity in the vicinity since the organisms on the fomites are readily resuspended in the air. To measure this route of transmission as well as droplet nuclei and similar particles moving directly from the host into the atmosphere, the contamination of the air can be sampled by a number of devices, some with only qualitative, some with quantitative characteristics.

Impaction-type samplers, although limited to the collection of bacteria, the authors said, are best suited to the demands of hospital use. For both bacteria and viruses, a liquid impinger can be used.

Hall and Decker described the various types of impaction-type samplers available, their operating characteristics, and their limitations.

They pointed out that the liquid impingers, the sieve, and the Andersen samplers provide both qualitative and quantitative information concerning airborne organisms. The slit-type sampler, because of its mechanical simplicity, its lack of manipulation of the sample after collection, and its time-concentration relationship, is particularly suitable for hospital use when the air being examined is essentially static. Particular advantage, they said, should be taken of the time-concentration relationship since this information can be of invaluable assistance in pinpointing a route of transmission and contributing to the epidemiology of the disease under study.

Nursing Research Takes Bearings

For the nursing profession to participate in scientific investigation of the effectiveness of its practice, declared Margaret Thomas, nursing consultant, Epidemiological Branch, Communicable Disease Center, it must clearly delineate this practice and join with the medical profession and related fields in setting up suitable methods of study.

Because nurses' inquiries about aseptic techniques made apparent the need for more specific recommended procedures in the control of staphylococcal infections, a status survey was made of the practices used in the obstetric departments of 13 medical centers.

The objectives of the survey were to determine what aseptic procedures were being used and whether they were used consistently, whether there was a relationship between the diligence with which the nurse carried them out and the incidence of known infections in the hospital, whether any studies had been done in the institutions for determining procedures to be used or their effectiveness, and how well currently recommended standards were being met.

Although a critical analysis of the results of the survey has not been completed, Thomas cited some of the general impressions of the investigators.

- Nurses seemed eager for consultation and for someone to listen to their ideas. They were zealously striving to enforce what they believed to be protective procedures.
- All infections committees of the institutions had nursing representatives who were not only involved in establishing control measures, but in some instances were actively engaged in maintaining reporting systems.
- Hospital administrators appeared anxious to protect their patients. The recognition of the importance of space and equipment in prevention and control of infections was evidenced by new construction and remodeling.
- On the negative side, the investigators found that the surveillance programs were not sufficiently organized to permit study of the relationship between incidence of infection and the adequacy of aseptic practices.
- The lack of knowledge of scientific principles was obvious. There were few instances of original scientific study as a basis for establishing aseptic practices. Most of the existing studies were in housekeeping departments and were mainly concerned with blankets and detergent sanitizers.
- There was an apparent lack of concern about time-temperature relationship in heat sterilization and time-dilution relationship in chemical sterilization.
- Many inconsistencies existed among the hospitals and even among the services of a given hospital. Examples of inconsistency were found in the length of time required to re-autoclave sterile equipment, different hand-scrub techniques for surgery and delivery rooms, and variance in the use of caps, gowns, and masks between surgery and obstetrics, also among types of personnel.

Nurses have assumed responsibility for investigating standard nursing procedures. However, Thomas said, they feel that this responsibility is not incumbent on them for procedures prescribed by the physician. The nurse has a professional responsibility for her personal hygiene. She should know how to protect her clothing from her patients and her patients from her clothing. She should determine a safe method for keeping her hands clean and whether the use of a mask would be a safety device for her or the patient. Unquestionably, the nurse develops the procedure for bathing adult patients, yet for the

care of an infant's skin she waits for medical prescription, she continued.

Therein, Thomas pointed out, lies the problem of not having specific answers to seemingly small details. The medical profession has not investigated prescribed nursing procedures extensively because its time and interest are logically focused on the more scientific clinical factors of patient care.

Thomas believes that a committee representing various disciplines concerned with hospital patient care and management will provide a "common sense" approach toward such issues.

The Chronic Diseases . . .

Industry Know-How For Public Health

For combating chronic diseases, Dr. A. L. Chapman, Assistant Surgeon General of the Public Health Service, urged public health workers to employ methods that have proved their value in the commercial world, such as motivational research, product development and marketing, mass production, and automation.

Chronic diseases, he said, are an economic drag, contributing as they do to the dwindling number of producers in relation to the number of consumers in the United States. According to the National Health Survey, approximately 17 million persons are limited in their activities by a chronic condition and 1.1 million are confined to hospitals.

Long-lasting diseases, resistant to therapy or cure, absorb expensive quantities of goods and services for treatment, he stated, with no economic return.

Awareness of the economic drain of chronic diseases is apparent in the growth of dollar appropriations to the National Institutes of Health and other research organizations, Chapman said, although support for the application of research findings has been uninspired. Spending millions for research and pennies for application is like buying bread and not eating it, he commented.

Chapman advocated that the accounting practice of balancing product development with marketing, sales, and distribution be adopted in public health. He asked, Why do children with rheumatic fever fail to get penicillin prophylaxis? Why are half the people in the United States with diabetes unaware of it? Where is the weak link in health's production line?

A conviction that ineptness in changing attitudes is one of the big handicaps of public health workers is responsible for the current rash of motivational research in the field.

He recommended also that automation and mass production will help laboratories to handle the growing analytical load of periodic physical and screening examinations. How else can the average laboratory handle a 10-fold increase in the present number of tests being performed, he asked. There are signs—the clinitron, the cytoanalyzer, and the autoanalyzer—that changes along these lines are in the making.

The laboratory director of the future, he predicted, will have to be teacher, trainer, researcher, and administrator as well as analyst. He will also have to obtain and commit a great deal more money to research projects and promote greater interest in the bread-and-butter importance of what his laboratory is doing.

Glaucoma Day Furthers Community Services

The outcome of two Glaucoma Days in Santa Barbara, Calif., has been high casefinding rates and an awareness among ophthalmologists of community needs for preventive services, reported Dr. Helen Hart, health officer of Santa Barbara.

On G-Day in 1956, 680 persons were screened, 192 referred for followup, and 47 found to have glaucoma. On G-Day in 1958, 680 were screened, 97 referred for followup, and 11 found to have glaucoma. The median age of the 1956 group was 66.2 years, of the 1958 group, 61.3 years.

Participating in the preparation, screening, and followup of the 1956 event were the California committee of the National Society for the Prevention of Blindness, Santa Barbara's ophthalmologists and their office staffs, Delta Gamma Sorority, Santa Barbara Eye Foundation, Blue Cross, school and county health department nurses, the city health department, an optical company, the county clinic, and a drug company.

The screening at the city recreation center included visual acuity, fundus and tension examinations, and an interview.

Hart described the followup activities. Persons with definite or suspected glaucoma who did not have their own ophthalmologists were assigned to one according to an alphabetical list. They included patients who were unable to pay or who stated they could pay a reasonable fee. Appointments were arranged at the county clinic for those eligible to receive care there. Ophthalmologists were asked to notify the health department of any patients in the definite or suspect categories who were not seen. Persons with other eye conditions were notified and advised to seek medical care.

The community's ophthalmologists initiated and planned the second Glaucoma Day in 1958, delegating specific tasks to the same groups who cooperated in 1956. Screening and followup activities were similar to those carried out in 1956.

Hart counted these additional benefits of Glaucoma Day. The ophthalmologists regard recurring G-Days as a way to serve the community and inform the public about eye conditions. Also, they have be-

gun another community service: vision testing of preschool children. The health department, in providing counseling, statistical, and followup services, gained understanding of its functions among the ophthalmologists and furthered a chronic disease program.

Cancer Tests Given Scotch Verdict

Experimental carcinogenesis in animals was reviewed by Dr. R. E. Eckardt, director, medical research division, Esso Research and Engineering Company, Linden, N.J., with emphasis on the public health interest in the inconsistencies, limitations, and drawbacks of available techniques for evaluating food additives. Final judgment in many instances, he indicated, must be the Scotch verdict, "not proven."

Eckardt stressed that the species of animal and type of test should be considered in evaluating carcinogenic properties of chemicals for public health purposes. He cautioned against oversimplification by commenting on the inadequacy of fluorescent spectroscopy for determining carcinogenicity. Many noncarcinogens fluoresce. And fluorescence can be quenched in others. In the biological field, he illustrated inconsistencies of responses to the same material by describing identical research with various animals, comparing the effects on the species.

Eckardt recounted experiments on subcutaneous tissues which indicated that the physical state of a plastic material might determine its carcinogenicity. Observing that subcutaneous injections of sugar and cholesterol produce sarcomas in rats and mice, he concluded that subcutaneous tissues are inappropriate test sites for evaluating the safety of food additives.

Polyaromatic hydrocarbons produce tumors on the skin and cancer in the forestomach of mice, Eckardt said, but the forestomach of the mouse is lined with squamous epithelium, not glandular epithelium as in the human. He noted that aminoazo compounds fed to rats result in liver tumors; however, there appears to be no counterpart to these experiments in man. Protein and riboflavin in the diet, he remarked, afford protection against these tumors; so does 0.003 percent methyl cholanthrene, a potent skin carcinogen.

Differences in susceptibility to specific carcinogens was confirmed by the observation that exposure to B-naphthylamine, and probably benzidine, produces bladder tumors in dogs and man, but in mice only when pellets are surgically implanted into the bladder. Eckardt suggested that it would be advantageous to develop understanding of the metabolic pathways involved with chemicals that induce tumors and cancers in various species of animals because if similar metabolic pathways are not present in the human, the likelihood of this compound being carcinogenic to man is probably quite remote. Recalling that 2-acetylaminofluorene, developed as an insecticide, produced a profusion of tumors at multiple sites in a variety of animals, he reaffirmed the need for testing.

In the field of food additives, Eckardt declared, experimental carcinogenesis is in its infancy. More basic fundamental research is needed. There is no one test or battery of tests of carcinogenicity which are appropriate for determining the safety of food additives. He recommended evaluating each compound to determine its chemical nature, probable concentration in the food supply, carcinogenicity, metabolic pathways in man and animals, and importance in our food technology.

Planned Prophylaxis Cuts Rheumatic Fever Toll

Cooperative planning for rheumatic fever prophylaxis in Connecticut since 1955 was described by Dr. Nicholas P. R. Spinelli, chairman of the Rheumatic Fever Committee, Connecticut Heart Association, Horace A. Brown, executive director, and Nicholas J. Lavnikevich, program director, of the association.

An investigation and planning committee formed by the association advised intensive, statewide professional education on prophylaxis, as a foundation for the program. Through cooperation of the State's pharmaceutical associations, negotiation, and competitive bidding, "prohibitive" penicillin prices were lowered. Indigent patients received penicillin free. Physicians applied to the association for medication for each patient. The application form states the criteria used by the physician for diagnosis of acute rheumatic fever. Four prescriptions with coded stubs, a year's penicillin doses, were issued to each approved application. Weekly coded stubs were returned by wholesalers to the association for records on patients' prophylaxis maintenance. When the fourth prescription stub was returned, a reapplication form was sent automatically with queries on the patients' progress, cooperation, and other infection and recurrence information.

Each recurrence is investigated by the committee's area physician. Bona fide recurrences have been low. Patient delinquency has also been cut significantly by dropping those not using prescriptions for more than a year.

They attributed a 20-fold rise in the number of streptococcal cultures projected for 1959 over 1954 to education efforts.

They suggested that pregnancy may be a strong factor in casefinding because in the childbearing ages, 25–44, about 65 percent of the patients were women, as against a 57 percent proportion of women among all patients. The 25–44 age group accounted for 33 percent of all in the plan. Throughout, the usual relations of patient to physician and pharmacist were maintained.

New York Experience

Another example of cooperative planning and operation in a rheumatic fever prophylaxis program

was reported by Dr. Katharine D. Brownell, director of the Manhattan Cardiac Program, New York City Department of Health, Margaret A. Losty, acting director of the department's bureau for handicapped children, and Helen M. O'Shaughnessey, director of community program, New York Heart Association.

The New York City Health Department and the New York Heart Association worked together within an established pattern of cooperation to set up a prophylaxis plan. Coordinated by a joint committee with visiting nurse representation, the program reaches more than 4,000 patients. Major obstacles were the high cost of penicillin and insufficient clinic staff for followup, revealed in a 1953 survey. These were overcome in large part by the association's purchase of oral penicillin for patients at clinics with approved programs and grants of heart association funds for selected followup services. The city also supplemented the supply of oral penicillin for clinics and the welfare department made it available for its clients.

In addition to intensifying case-finding in schools, for referral and followup, the health department promoted prophylaxis among physicians through consultations. The joint committee arranged discussion groups and guides for physicians.

The authors observed that in the two special health department prophylaxis clinics in the plan, verification of diagnosis has been acceptable to the referring physicians. Pinpointing followup as a weak element in the program, they consider that it can be strengthened by adequate clerical staff and well-planned and well-maintained files, supplemented by followup by the clinic social worker and the school nurse.

Followup is hampered also, they said, by frequent changes of residence and by the difficulty of keeping in touch with newly adolescent patients. A central registry is helpful in maintaining followup of these groups.

The voluntary agency has been serving primarily as a catalyst, they concluded. It has also backed, on a demonstration basis, a clinic program reaching a large proportion of the city's medically indigent patients. In the development of a wider program under health department responsibility the support of other agencies, both official and voluntary, and practicing physicians, must be obtained.

The Michigan Program

Physicians receive free prophylactic agents for treating rheumatic fever patients in nonacute stages in Michigan's statewide prophylactic program. In administrative structure, Dr. Carleton Dean, director of the Michigan Crippled Children Commission, and Dr. George H. Agate, epidemiologist, City Health Department of Lansing, said the program utilized the pivotal role of the family physician.

Beginning January 1956, on termination of a successful pilot project in the Upper Peninsula, the Michigan Crippled Children Commission and the Michigan State Department of Health joined efforts. The health department distributes penicillin G and sulfadiazine to physicians and the commission finances medical supervision of injections to children in the commission's regular program.

Dean stated that continuous year-round medication was recommended for an indeterminate period. Rather than daily oral medication, monthly intramuscular doses of benzathine

Bargain Exhibits

Two outstanding exhibits at the APHA conference, cited for excellence, also were models of economy.

The Public Health Service exhibit on seat belts, probably the busiest in the hall, was built for less than $150 and can be duplicated for much less. It consisted of a table bearing a model of an urban street intersection, and four toy automobiles, built to explode on impact. These toy cars were purchased in a drug store. The only modifications for the exhibit were that toy figures were seated in the cars and rubber bands were installed to simulate seat belts for some of the "passengers." When the cars collided, passengers not restrained by the "belts" were thrown into the street, with impressively disastrous effects.

The Brookline (Mass.) Health Department exhibit on glaucoma, constructed at a cost of only $50, was used in connection with the glaucoma clinic sponsored by the Brookline Lions Club and the Brookline Health Department. The message of the exhibit was: "Glaucoma should be found! Two to four percent of adults over 40 have glaucoma! Brookline finds it!" At no additional outlay, the exhibit was built around a slide projector owned by the health department. Twelve colored slides enabled a viewer to accompany a patient through the various steps and procedures of this clinic.

pencillin G were found to facilitate supervision of patients. Dean suggested that the child patient's emotional reaction to monthly injections might be studied as related to the plan's success.

When a child discontinues treatment, the commission queries the physician first. If no explanation is found, it writes the family. Follow-up continues if the family has moved. In the period, January 1, through June 30, 1959, 393 children were receiving prophylactic treatment under the commission's jurisdiction. Excluded were 10 cases dropped because they could not be located after residence change and 10 others who discontinued treatment for unknown reasons.

Among needed ingredients for a good program, Dean mentioned cooperation of parents and the availability of diagnostic and consultation facilities, as well as the understanding and cooperation of the practicing physician in the community.

Youth Habits . . .

Good Adolescent Driving Reduces Traffic Toll

"In our culture, a child is passed from one authority to another—home, school, church, community. He is observed, evaluated, and regulated. And then suddenly he can get in his car and drive far enough in a short time to be anonymous and free, free to maim and kill himself and others. What is the solution?"

Dr. James L. Malfetti, executive officer of the safety research and education project of Columbia University, presenting this theme, stated that authorities claim drivers cause between 80 and 90 percent of the traffic accidents in the United States. He emphasized that drivers 16 to 24 years of age cause a disproportionately large number of the accidents which kill approximately 40,000 people a year.

Stating that if we can do something about adolescent drivers, we can significantly reduce the total number of accidents, Malfetti called first on parents to set a good example. He also called upon community leaders to build recognition of moral responsibility for traffic damage, injuries, and death through talks with license applicants. Other recommendations by Malfetti were:

- Higher quality tests for licenses.
- Realistic speed regulations.
- Improved driver education courses, emphasizing student decisions on good driving techniques.
- Rewards for courteous driving and lifesaving maneuvers.
- Clinics for chronic adolescent traffic violators.

Malfetti recognized that no driver, adolescent or adult, is immune to accident-producing behavior. He urged full use of mechanical devices in accelerating, steering, and braking, to correct or warn drivers when safe limits are exceeded. Such devices are available, Malfetti said, and others can be developed.

Rather than attempts to change basic personality traits of drivers, Malfetti recommended full use of techniques to curb the automobile when the driver fails to function at his efficient best.

Teaching Health To Teenagers

Textbooks on health for high school students are too difficult in some instances and in others so easy as to be boring, according to Dr. Howard S. Hoyman, head of the department of health and safety education, University of Illinois, and his assistant, Aubrey C. McTaggart.

Eleven widely used high school textbooks on health were tested for reading difficulty using the 1948 Flesch reading ease formula, Hoyman said, adding that statistical formulas were used to test the significance of the mean differences at the 5 percent level of confidence.

The findings, which agree with the pilot studies of Taylor, Hanson, and Zaharko, indicate that:

- Some widely used modern high school health textbooks, especially those used in ninth grade classes, are probably too difficult for average, below average, and poor readers to use effectively.
- Other widely used health textbooks, especially those used in the tenth grade or higher, are too easy for above average and superior readers.
- Apparently most new editions of health textbooks retained previous reading difficulty levels.
- None of the textbooks studied appeared to use reading difficulty progression, from less difficult material at the beginning of the book to more difficult in later chapters.
- The use of one health textbook for all students in one high school grade is apt to mean that the text is too easy for some and too difficult for others.

Many complex factors contribute to reading difficulty, Hoyman said, mentioning content, style, organization, and format. Readability yardsticks, such as the Flesch formula, test factors related to style only as a determinant of reading difficulty. The Flesch formula should not be expected to supply answers about the other aspects of readability of high school textbooks on health, Hoyman emphasized, although such tests do give valuable information in any effort to supply the students with an appropriate text.

Recommendations by Hoyman included discontinuance of the widespread practice of using one health textbook for all students in a given class or grade. The use of several textbooks permits individual assignment according to reading difficulty. He also suggested the possibility of reorganization of high school students into homogeneous groups within a grade or class, ac-

cording to their reading and learning ability.

New Thinking Needed On Teenage Drinking

Educators of teenagers are behind the times in methods of teaching the inherent dangers of drinking, Raymond G. McCarthy, associate professor of health education at Yale University, suggested.

Teaching about alcohol has been required by law for many years in every State, he said, but primarily to encourage total abstinence by emphasizing the dangers of drinking. The ineffectiveness of the psychology-of-fear approach is apparent in the fact that approximately 70 percent of all adults over the age of 15 years use alcoholic beverages. Research among high school students in New York, Wisconsin, and Kansas, he continued, reveals a substantial proportion of drinkers, many with parental consent.

McCarthy believes these statistics challenge the traditional classroom approach to alcohol education in public schools. Information about the bizarre results of alcoholism, which affects roughly 6 percent of all users of alcohol, is of little significance to teenagers, he stated, adding that it would be more realistic to emphasize the dangers of intoxication and its attendant traffic accidents, violation of family or church standards, and behavior disturbing to the individual.

Teaching should embody a set of facts about alcohol as well as consideration of different attitudes toward alcohol use and nonuse in our society. The schools have not translated this change in cultural attitudes into classroom practice, McCarthy concluded.

Teens Determine Smoking Habit

Smoking in the United States can be curbed best by informing young people of its risk to health, asserted Dr. Roger S. Mitchell, director of the Colorado Foundation for Research in Tuberculosis and associate professor of medicine, University of Colorado.

Stating that cigarette advertisers direct multimillion dollar campaigns to solicit "still unaddicted teenagers," Mitchell said, it would not be a bad idea to "take a leaf out of their book."

In reviewing what he termed "presently available facts with regard to smoking and health," Mitchell reviewed published data on the rising tobacco consumption for the past 60 years; total death rates by age and smoking habits; mortality ratios by amount of smoking, for ex-smokers, and for various causes of death; various causes of excess deaths among men who smoke regularly; male death rates for various diseases and lung mortality rates for men, by amount smoked; lung cancer mortality rates for rural and urban residents; comparative smoking habits of men and women; and trends in environmental factors.

Mitchell believes smoking is one of the multiple causes of lung cancer; shortens life by at least 5 years, through increased risk of atherosclerosis, cancer, and chronic obstructive airway disease; shortens breath; impairs physical performance; and aggravates or delays healing of stomach ulcers.

High school students can be taught the hazards of smoking, Mitchell stated. He recommended:

- Efforts to engender student requests for health education on smoking.
- Question and answer sessions.
- Participation by parents, local and national medical societies, health organizations, and legislators.
- An adult approach, emphasizing the maturity of self-restraint and discipline.
- Minimal smoking, preferably pipes, for those addicted.
- Research which will lead to the elimination of injurious factors in smoking.
- A good example by parents and adult associates.

Gerontological Studies . . .

Aging Population Needs New Mores

With a significant increase in average life expectancy, major social changes are needed to reap full advantage from the added years, in the opinion of Dr. Edward L. Bortz, medical service chief, Lankenau Hospital, Philadelphia. Customs and social attitudes, he says, ought to esteem maturity and recognize its potentials. Also, he said, the family must be bolstered as a setting for aging.

A new index for aging, based on biological condition, such as performance and capacity, Bortz said, would be a more satisfactory yardstick than the calendar. However, much of so-called physical evidence of age, he said, is actually evidence of conditions which with foresight could be prevented or at least delayed.

Citing the ramifications of a Cornell longevity study on laboratory animals, Bortz envisions an average human life of 100 healthy years. These he divides into trimesters, the last called the "summit of the years," in which intellectual growth and social participation may continue after 80. Much deterioration is avoidable through sensible health practices, he pointed out, referring also to promising experiments to retard deterioration of tissues of the vascular, skeletal, and nervous systems.

Deploring the current practice of retiring healthy and active workers from established occupations, he stated that a second career could

begin at 65, with retirement deferred to 85 or 90.

Physicians and medical educators, Bortz concluded, have a major function in determining whether or not the added years are to be characterized by weakness, depression, and deterioration, or "by flowering of the major powers inherent in each citizen."

Aged Seek Services More Than Beds

To weigh the present and future load of chronic ills in Monroe County, N.Y., the agencies concerned and their patients were analyzed in a study reported by Walter Wenkert, secretary of the health division, Council of Social Agencies, Rochester, N.Y., and Dr. Milton Terris, professor of epidemiology, Tulane University School of Medicine. A major conclusion is that strengthened services may obviate the need for additional beds.

The 18-month study was originated by a citizens committee and financed by the Community Chest and the County Board of Supervisors. Eight general hospitals, 4 long-term hospitals, 30 private nursing homes, 8 infirmaries of homes for the aged, and 16 public health nursing agencies were questioned about admission and discharge policies, scope and purpose of services, staffing patterns, staff education and training, costs, income, and future plans.

The medical staffs or administrators of the agencies and institutions supplied 1-day census information on 3,780 patients. Each member of a clinical review team (physician, public health nurse, and social worker) independently interviewed 179 patients, a random sample of the census group.

The clinical review team differed with the staffs of the agencies in judgments of appropriate levels of care. The team felt that 85 percent of the hospital patients, but only a third of the home care patients, were receiving care at the appropriate level; the agency staffs felt that 41 percent of the hospital patients and 70 percent of the home care patients were at the proper level of care.

If the team's judgments on levels of care are projected to the total study population, new and strengthened services should be planned and created before installing additional hospital, infirmary, or nursing home beds, the authors concluded.

They pointed out five major gaps in services which the study disclosed.

- Physicians need the assistance of nurses, psychologists, physical therapists, social workers, and other professional persons to evaluate a patient's total care requirements.
- Rehabilitation services, in the form of occupational therapy, medical social work, and recreation, as well as physical medicine, are needed in hospitals, nursing homes, homes for the aged, and for home care patients.
- Of the 3,780 patients, from 88 to 554, if the review team's judgments concerning the random sample are projected to the total study group, need organized home care.
- Agencies, because they are limited by their special concerns or by other requirements, are unable to provide the multiple services needed by patients with chronic disease.
- Although there were 76 clinical projects related to chronic disease in the county, no research was being done on the administrative, operational, or service aspects of long-range care. There were no formal affiliations among institutions providing different levels of care to share professional services and facilities.

Plans to pursue specific recommendations of the study are being made by these institutions: A home for the aged is evaluating intake policies. A hospital is preparing a comprehensive rehabilitation program. A hospital, the health department, and the visiting nurse service are developing an organized home care program. Joint services are being arranged between a general hospital and a home for the aged. A convalescent hospital for physically handicapped children is being closed. The council of homes for the aged is defining and cost accounting levels of care. Blue Cross, the medical society, the hospital council, and the study's followup committee are increasing voluntary health insurance coverage among the aged.

First Admission Study Asks Why Aged Crack

Causes of mental breakdown among the aged were sought in a study of the background of 26,645 first admissions to Ohio State mental hospitals January 1948 through June 1952, reported by Ben Z. Locke and Dr. Morton Kramer, biometricians, National Institute of Mental Health, and Dr. Benjamin Pasamanick, research director of the Psychiatric Institute and Hospital, Columbus, Ohio.

Of the total studied, 5,676 were diagnosed as having mental diseases of the senium. These, it was observed, were more likely than not to come from cities, to be male, to lack higher education, and to be divorced, separated, or single rather than married. Among women, the rate of admission was higher for those employed at jobs other than housework. Among men, occupations having the higher rates of admission were laborers, farmers, service workers, and craftsmen.

For confidence in these findings, the authors remarked, supplemental data is needed on mental illness among the noninstitutionalized and in other facilities for aged mental patients.

Although population records suggest the probability of a marked increase in admissions of mental patients with diseases of the senium, by 1980 more than 60 percent above the 1950 level, there are social changes which they feel may offset this trend.

Apart from population changes, there may be developments in institutional care, community services, and home visiting, they said, which

will affect the mental conditions of the aged. Attitudes of both the aged and the community also may be altered, they suggested, in a direction that will reduce present mental distress. For example, they mentioned services which would offset the mental and physical effects of inactivity and confinement, or attitudes which would help the ex-breadwinner to adjust to a new status.

On the whole, the authors believe changes are in the direction of supporting mental health for the aged. Physical labor, they predict, will become less taxing, income more certain and more nearly adequate, constructive use of leisure time more common, nutrition and other health services strengthened, and educational levels raised. The character of institutions for the aged, they predict, will become more acceptable also.

Mental Ills of Aged Need Special Care

Knowledge of the role of homes for the aged in meeting the health needs of our senior citizens is meager, reported Dr. Franz Goldmann, director of health study, Council of Jewish Federations and Welfare Funds of New York City.

A large-scale inquiry into coordination of medical care in chronic illness, supported by the Public Health Service, presented an opportunity to investigate the part played by homes for the aged. Cross-sectional case studies made in the spring of 1958 covered 530 residents of five Jewish homes for the aged, in Chicago, Miami, Philadelphia, St. Louis, and Toronto. Descriptive material on organization, functions, and relationships in 1957 was collected from 70 such homes in the United States and Canada.

Findings, according to Goldmann, showed almost all of the 530 residents of the five homes have multiple chronic ailments. Many are substantially disabled. The well resident is the exception.

The most common affliction is mental impairment, with symptoms of temporary or continuous confusion. Marked emotional disorders are widespread among the residents studied, Goldmann reported.

The detailed analysis of 70 homes revealed that most of these institutions perform the functions of high-grade nursing homes and emphasize comprehensive health service, including psychiatric care, and teamwork. Goldmann said the experience gained at homes with relatively advanced psychiatric service clearly demonstrates its value to the patients and the possibility, through more widespread use of such service, of reducing transfers to mental hospitals to a minimum.

A realistic policy is needed, Goldmann added, for both the long-term institutional care of persons in ill health and the housing of senior citizens capable of self-care.

Water and Wastes . . .

Contract Health Services Overcome Complexities

Small municipalities, financially unable to maintain a health officer and health services of their own, are contracting for such services through county or State health departments, according to H. Clifford Mitchell, director of sanitation, St. Louis (Mo.) County Health Department.

A number of such communities have purchased sanitation services, and school districts have obtained mental health, dental, and nursing services through contracts in the past few years, Mitchell reported. His own division of sanitation, which serves the metropolitan St. Louis area excluding the city of St. Louis, has in 5 years expanded its services in this way to more than 200,000 persons previously without health services, he said.

St. Louis County's population increased from 274,000 in 1940 to 700,000 in 1959, and the number of its municipalities rose from 40 to 98, with an accompanying demand for municipal sanitation services such as refuse and rodent control, water supply, sewage disposal, swimming pool inspections, air pollution control, and industrial hygiene.

Legislation restricted the county health department from providing health services directly on a county-wide basis, requiring each municipality to provide its own, but county ordinances made contract service possible.

The first attempt at such cooperation, limited to restaurant inspection and rabies control, was so well received, according to Mitchell, that in 1954 the county entered into a unique contract with the city of Jennings, Mo., population 18,000. Under this arrangement, the county health commissioner took on the duties of health commissioner of Jennings without an additional remuneration, one well-trained and experienced sanitarian was assigned to the community full time, and the sanitation code of the county was accepted by the municipality. The city supplied office space and all utilities and reimbursed the county for the sanitarian's salary and transportation.

At the end of a 12-month trial, the mayor and council of Jennings petitioned for continuation of the service indefinitely. Scores of other small cities followed Jennings' example, and the county department is now giving contractual services to 52 municipalities, Mitchell reported.

He pointed out that this procedure provides a partial solution to a tough problem and that both community and department gain from it. The municipalities receive their necessary sanitation and other health services from competent personnel at reasonable cost; the county health depart-

ment gains through development of closer ties with cities and greater control over countywide problems of public health.

Mitchell admitted it would be easier and less cumbersome to have sufficient funds and appropriate legislation to provide uniform services throughout the county without regard to municipal boundary lines, but the contract program does keep department personnel on their toes to provide satisfactory service. They know they are directly responsible to the governmental agency which is contracting for the service and that contracts can be canceled upon 30 days' notice. The procedure has been studied by a number of organizations such as the League of Municipalities, the Ford Foundation, and the American Public Health Association, Mitchell said.

State Board Promotes Water Enough for All

Adequate water supplies, reported Dwight F. Metzler, chief engineer of the Kansas State Board of Health, are a basic public health responsibility. On this principle, State resources were directed to help communities in Kansas overcome recent, present, and prospective water shortages.

Deficient water supplies in American cities, he recalled, had been reported recently by the American Water Works Association, which found many American cities over 25,000 lacking capacity in water mains, pumping capacity, and storage facilities.

At the same time, demands for water have been complicated by increased per capita use in a growing population.

Although not a single case of waterborne disease is known to have resulted from deficiencies in their systems in recent years, many Kansas cities had come to the point of rationing water uses in the dry years of 1952–57. Following an investigation of the water shortages, the State discovered the main factor was not a lack of water but a lack of planning for its storage, treatment, and distribution.

Emergency efforts to supply deficient communities included hauling, temporary treatment systems, cloud seeding, and reuse of waste water. Long-range efforts included evaluations of municipal supplies and encouragement of efforts to improve and expand water systems.

Metzler estimated that it takes from 3 to 5 years to proceed from the finding that facilities are needed to complete plans, gain official and public acceptance, and complete financing and construction.

The State water resources board has taken the main responsibility for determining the availability and quantity of ground water, as the State board of health has for determining the chemical quality. Information on hydrology has been included in an annual program of inservice training for consulting sanitary engineers with some consequent changes in design practice.

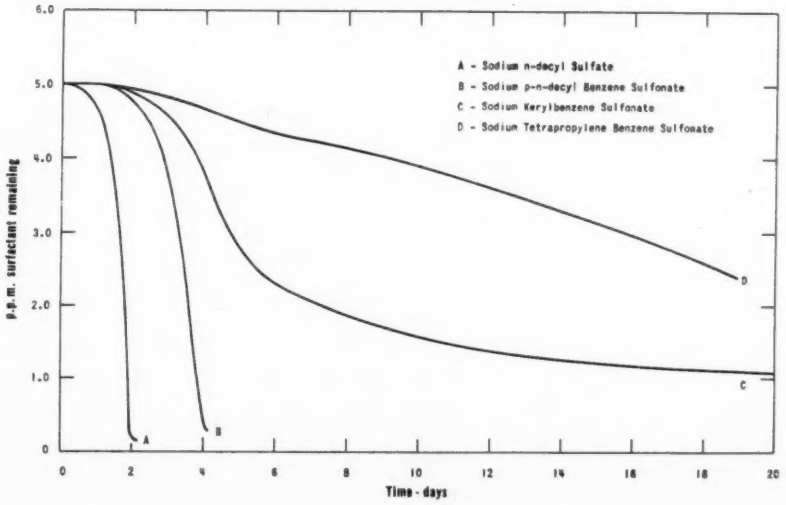
A critical element in the program, he said, has been the periodic appraisal of water systems by board engineers, who follow their reports with appearances before the governing bodies of the cities, to explain the deficiencies and to urge their correction. Supporting this program, the League of Municipalities in Kansas prints annual board of health tabulations of municipal waterworks data, including capacities and daily demand.

Identifies Guilty Syndet Agents

The main source of the public health problems created by the Nation's current annual consumption of 3.8 billion pounds of synthetic detergents was identified by Jesse M. Cohen, Robert A. Taft Sanitary Engineering Center, Public Health Service. He also reported that active research on new forms of detergents offers a possible release from the present difficulties.

Surfactants of the ABS-type, the most common cleansing agents of today's syndets, were specified as responsible for some water and sewage plant problems which have emerged in recent years. Among the problems he mentioned are frothing in aeration tanks and outfall lines in sewage treatment plants, ABS residues in sewage effluents, additional phosphate nutrient for growths of algae with their attendant problems, and contamination of ground water and drinking water with ABS residues. Many of these effects, he said, are due to one outstanding difference be-

Decrease in concentration of detergents in river water at 18°–19° C.



tween soap, almost the exclusive cleaner 20 years ago, and the syndets currently in use.

Whereas soaps are easily decomposed by biological activity, the common syndets employing ABS-type surfactants resist biological decomposition. For this reason, he explained, syndets can survive, at least in part, sewage treatment, natural biological oxidation processes in streams and ground water travel to appear in varying reduced concentrations in drinking water. An early evidence of detergent pollution is foaming of tapwater, which occurs with concentrations as low as 0.8 ppm.

All detergent molecules, both soap and syndet, contain a long hydrocarbon chain. In soaps, which are derived from fatty acids, and in syndets derived from fatty acids or alcohol, the hydrocarbon chains are readily decomposed to smaller fragments and eventually to carbon dioxide and water.

The raw material for the more commonly used ABS-type surfactants is propylene, which is obtained from petroleum. The processing of propylene for these surfactants yields a detergent molecule containing an alkyl group which is a saturated, highly branched hydrocarbon. More important, this hydrocarbon chain contains a quaternary carbon atom. Extensive biochemical studies have shown that this chemical structure of ABS prevents microbial oxidation and makes it possible for the ABS molecule to persist in biologically active solutions like sewage or streams.

The accompanying chart illustrates the rates at which the various types of surfactants are decomposed in river water. Compounds A and B, derived from fatty acid and straight-chain hydrocarbons, are biologically decomposed in 2 to 4 days. Compounds C and D, the ABS-type containing an alkyl group of petroleum origin, persist for longer than 20 days, which is long enough for this contaminated water to arrive at a water treatment plant in the water supply.

Up to the present time, there is no economical way of removing surfactant material from drinking water. Common water treatment processes, such as chlorination, chemical coagulation, and rapid sand filtration, reduce surfactant concentrations by either insignificant amounts or not at all. Current research is therefore directed primarily toward removal at the sewage treatment plant.

Research in another direction is of equal importance. Consideration has been given by manufacturers to development of other compounds equal in cleansing properties to the present surfactants but different in that they would be vulnerable to microbiological degradation.

Private Swimming Pool Standards Given

Swimming pools in the backyard and their public health implications were discussed by Edward L. Stockton, municipal public health engineer, when he reported on standards of construction and operation of privately owned pools, as recently established in Grand Rapids, Mich.

Stockton stated that a simple system of requirements has a better chance to achieve satisfactory operations. Main requirements are a 4-foot fence surrounding the pool; a minimum of two inlets on rectangular pools, more on free-form pools; complete replenishment of water within every 12 hours, with rate of filtration not to exceed 3 gallons per square foot per day; and uniform application of chlorine to maintain a constant residual of between 0.4 and 0.6 parts per million.

Most pools are either 16 by 36 feet or 20 by 40 feet in size, he continued. Diatomite filters are used on all newer pools, and skimmers instead of scum gutters. Pressure gauges or rate of flow gauges are not required.

Chlorination machines are permitted, Stockton said, adding that most people use chlorine tablets. When liquid hypochloride is used, it is suggested that one-half cup of Calgon per 15 gallons of solution be added to prevent clogging and aid in pH control.

Water in all pools in Grand Rapids was sampled twice in 1958 and 1959. Thirty percent of these samples were unsatisfactory on bacteria plate count and 26 percent by coliform index, mainly as a result of an insufficient period of filtration. Samples of water compared with chlorine residuals at time of sampling showed approximately the same percentage of unsatisfactory results.

Examples of difficulties were cited by Stockton. Many pools are not operated 12 hours or longer. As a result, he said, it has been impossible to enforce the requirement of replenishment of water every 12 hours. Many operators are not aware, he added, that diatomite filters must be recharged when a pool is reopened.

Stockton also mentioned instances of plastic lines connected directly to the sewer for backwashing operations. He said closer field inspection will be necessary to prevent the installation of such cross connections.

Adoption of a city ordinance is essential, Stockton stated. He recommended a reasonable attitude in stating pool requirements, emphasizing that these requirements should have broad functional outlines rather than being confined to specific details. Because of the rapidly changing picture in pool installations, specific standards tend to halt full use by the public of new and better designs.

Pay-as-You-Grow Sewer System

A complete suburban sewer and sewage treatment system, financed as easily as a piecemeal program, with an eye to the needs of the next generation, was described by Peter Homack, consulting engineer of Elson T. Killam Associates, Inc., Millburn, N.J.

Square in the path of a growing urban population, the township of Berkeley Heights, N.J., in 1955 confronted the familiar issue: to be or not to be dotted with septic tanks. Despite a low population density, with fewer than 1,000 homes in an area of 6.3 square miles, the township found its subsurface disposal systems, including septic tanks, tile fields, and cesspools, were a menace to families on the lower slopes. Impervious soil, traprock, and a high table of ground water gave little opportunity for remnants of domesticity to sink harmlessly away.

Builders, eager to add to the value of real estate in the township, were disappointed to learn that their plans for installing more individual disposal systems, under a tightened State health code, would be disapproved. As they presented alternative proposals for sewage treatment plants for small neighborhoods, the so-called package plants, township authorities began to look into the possibility of a central system.

The builders agreed to a prepayment assessment of $350 per house projected. A capital improvement fund of the township contained another $150,000. The builders also planned to install at their own expense lateral and interceptor sewers passing through their properties. As a result, nearly half of the cost of the system was supported by builders of 112 new homes. The balance was financed with bonds backed by the credit of the township.

Construction started in 1956. The treatment plant began operation the following year. Since then, 300 homes per year have been connected to the system, and neighboring communities are asking for an opportunity to tie in. It is probable that with revenues from other townships, and a local sewer service charge of $20 per home connected to the system, the income from the plant will exceed its operating and carrying charges.

With extension of the sewer system to 80 percent of the homes in the township, 1,600 units will be connected. The total cost of the system, including lines paid for by builders, is about $3 million.

The design, however, provides for an eventual population of at least 20,000. The sewers are large enough to be adequate for the township population 40 years in the future, and the treatment plant is meant to serve without expansion for about 15 years.

The annual interest and amortization charge, said Homack, is no more than it would have cost to undertake a limited sewer construction program, year by year.

Package Plants Evaluated

Package plants are here to stay is the conclusion of John E. Kiker, Jr., professor of civil engineering at the University of Florida. But he believes many improvements in design and operation are necessary.

A study of such plants, in comparison with conventional sewage treatment plants, was undertaken in Florida in 1958, under the general sponsorship of David B. Lee, director of the bureau of sanitary engineering of the State board of health, with collaboration of the university and the Public Health Service.

Under far from ideal conditions, the investigation succeeded at least in improving its methods of evaluation, and in developing information which led Kiker to draw certain conclusions, as follows:

- Effective results with package plants, some of which were excellent, depend on the quality of maintenance and operation. For comparable results, conventional plants need less attention than the others.
- There is as yet no such thing as a "maintenance free" package plant. No mechanical aeration plant has "only simple mechanical components." Troubleshooters ought to be available wherever such plants are installed.
- All plants should have convenient and accessible flow measuring devices, preferably with a totalizing meter or recording device, as well as electric power meters, if costs and performance are to be appraised.
- Plants which do not have adequate laboratory facilities, or sanitary facilities, including showers for personnel, are seldom operated properly.

(A student, John E. Hagan III, who shared in the investigation, commented, "Lack of laboratory facilities greatly hinders the operator. There is always a tendency to leave undone anything which seems inconvenient or difficult; also, where the operator has many other duties, the time element may become important. Convenient laboratory facilities will greatly reduce the tendency to overlook routine lab work.")

- Composite daytime samples are more suitable for evaluation of package plant operations than those taken around the clock.
- Designers of sewage treatment plants would do a better job if they gave more consideration to operating tasks. Many plants are designed without provision for steps or sampling facilities. Other deficiencies, sometimes hazardous, are an absence of handrails around tanks, inadequate walks, open channels, and insufficient lighting.
- Plants should be at least 500 feet away from the nearest residence, as a protection against noise and odor.
- Air compressors should be provided in duplicate, as insurance against a failure.

Further studies of cost, design, and operation are recommended by Kiker.

Design for Burning Urged for Refuse

Nothing is wrong with incineration that proper design and operation cannot cure, according to Glen H. Abplanalp and Junius W. Stephenson, consulting engineers with Havens and Emerson, New York City.

Tracing the history of incineration, they put much of the responsibility for failures on the tendency to

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accept manufacturers' designs and ratings, rather than designs and ratings independently determined. Only Connecticut, they said, has set State criteria which incinerators must meet, and they said none of the burners installed in recent years in that State are known to be unsatisfactory.

A technological change which encourages incineration, they said, is the increase in the marketing of trimmed food. While the packers sell the stems and peelings and other trim for processing as fertilizers, the ratio of garbage to rubbish in domestic refuse has declined from 50–50 to 10–90. As a result, modern refuse is lighter, drier, bulkier, and more combustible than in the past, with the result that, in operating an incinerator today, the task is often one of holding temperatures within reasonable limits while maintaining desired burning rates.

States should give attention to incineration, they said, because the supply of land suitable for fill operations is limited. Nevertheless, only Connecticut, Florida, and New Jersey require that incinerators be designed by qualified engineers. Only Hawaii, New Jersey, and Oregon have established specific regulations for incinerator operation, but in each case the regulations are based entirely on air pollution standards. The authors recommended that standards apply also to storage, handling, safety, residue disposal, and general sanitation.

The consensus of State officials, they said, favors closer State control over all phases of refuse disposal, with detailed regulations and power of enforcement. The authors concluded that health departments logically should guide refuse disposal in a manner comparable to their present guidance of water and sewage treatment.

Landfills Replace Jersey Dumps

The figures tell the story of New Jersey's achievement in developing sanitary methods of refuse and garbage disposal, under chapter 8 of the State Sanitary Code, which became effective July 1, 1958, according to Alfred H. Fletcher, director of environmental health, and John Zemlansky, principal sanitarian, of the State health department.

The number of sanitary landfills in the State at that time was 33, serving 149 municipalities with 19 percent of the population. (Another 16 percent were served by 18 incinerators.)

Fifteen months later, 100 sanitary landfills served 299 municipalities, with 44 percent of the State population. (The 16 incinerators still in operation then served 12 percent.)

First move in the change came with the recommendation of a 1953 advisory committee, proposing legislation to outlaw open dumps and to establish a code for sanitary landfills.

While the program still has room to advance, the experience to date is useful to the remaining municipalities of the 567 subject to the code.

Two landfills charge for disposal by weight, at rates ranging from $1 to $3 a ton.

Others charge from 10 to 30 cents per cubic yard.

Still others charge $2 per truck load, or $1 to $1.25 per person per year. A few charge $1.25 to $3.50 per family.

Hauling distances run as high as 28 miles, but no municipality is more than 10 miles distant, in a beeline, from a sanitary landfill.

The authors find that landfills are less costly to operate than the open dumps they are replacing, in part because vehicles suffer less damage on the compacted terrain. Another economy is that landfills do not require the waterlines needed to control spontaneous fires in dumps, or policing, or the legal services which surround a public nuisance.

Most collection and disposal of refuse in the State begins with a contract between an individual household and a private contractor. This system characterizes suburban settlement. The greatest volume of refuse is disposed of under contract between a municipality and private enterprise, obtained by competitive bidding. The least prevalent method is municipal ownership and operation of the system.

Air Pollution . . .

Atmospheric Pollution Public Worry No. 5

Air pollution ranked fifth in seriousness among 10 selected community problems in a survey of public awareness in Erie County, N.Y., reported Dr. Preston Valien, former technical consultant, New York State Air Pollution Control Board, Albany. Outranking air pollution, according to respondents, were unemployment, automobile accidents, juvenile delinquency, and alcoholism. But air pollution outranked factory accidents, contagious diseases and epidemics, sewage disposal, exposure to radiation, and home accidents.

A probability sample of 462 households in Buffalo and 481 in the county, with respondents classified by sex, educational level, socioeconomic status, and residential areas, was surveyed, Valien explained.

Slightly more women than men viewed air pollution as a serious problem. Air pollution was designated as "very serious" by 19 percent of the group, "somewhat serious" by 16 percent, and the rest considered it "not serious" or didn't know.

By educational level, the percentage of respondents describing air pollution as "not serious" ranged from 47 percent of those completing

eight grades or less of schooling to 69 percent of those with some college training. Seventeen percent of those in the lowest educational category and 25 percent of those at the bottom fourth of the socioeconomic scale answered "don't know" concerning the seriousness of the air pollution problem, said Valien.

Only 53 percent of those questioned thought air pollution was definitely a public health matter, although nearly 80 percent classified control of contagious diseases and epidemics and sewage disposal as public health concerns. The concept of air pollution as a public health matter did not vary on the socioeconomic scale or by rental area, but it was recognized more frequently as educational level went up.

The interviewees were asked to indicate any physical discomforts and property damages which may have resulted from polluted air. Unpleasant odors were named by 42 percent of the Buffalo residents and 29 percent of the county residents. Coughing, sneezing, and difficulty in breathing were listed by 10 to 13 percent of the Buffalo respondents.

Property damages from air pollution, reported by 59 percent of those in low rental residential areas and 48 percent in the high rental areas, were listed most frequently as dirty house paint, dirt on the family wash, and damaged car paint, the author said.

Air pollution had a bad effect on people's health, 87.5 percent of the group believed, was bad for real estate values, thought 80 percent, and had a bad effect on business in general, 60 percent felt.

Asked to name important sources of polluted air, 80 percent named factories; 61 percent, buses; 53 percent, city dumps; 45 percent, automobiles; and 11 percent, homes. In investigating how the respondents' actions contributed to air pollution, approximately 30 percent said they sometimes burned leaves, papers, or trash at home, and 60 percent of these had done so within the previous week.

Forty-five percent of the group said they had read or heard something recently about air pollution, most often that it was a problem in other States, Valien said. Asked to give sources they would depend on for information about air pollution, 41 percent preferred newspapers; 21 percent, television; 18 percent, radio; and 17 percent, pamphlets. However, these responses varied according to educational level, with pamphlets named primarily by the college group, and television by the less educated. These preferences for a specific medium as an information source have important implications in educating the public concerning air pollution and other aspects of health information, said Valien.

Mortality Data Reflects Air Pollution

Use mortality data to study possible health effects of air pollution, suggested John C. Rumford, public health analyst, Air Pollution Medical Branch, Public Health Service.

He outlined simple procedures which local health agencies can employ to compare intra-area and temporal variations in mortality to variations in indexes of air pollution and other environmental factors.

Intra-area or intracity investigations are based on the assumption that if there is an association between manifestations of air pollution and mortality, residents in areas of high pollution should have higher mortality rates. Because these areas usually have other adverse environmental conditions, the total socioeconomic complex of an area must be considered, he said.

In these analyses, he explained, the study area is usually subdivided into components such as census tracts, community areas, economic areas, or health districts with available population statistics. The subdivisions are then characterized by manifestations of air pollution and other factors such as income, housing, education, and racial composition.

Rumford cited, as an example, a study of Philadelphia health districts. Preliminary results suggested that pneumonia and arteriosclerotic heart disease were apparently equally influenced by both variation in dustfall and socioeconomic variables. Variation in chronic rheumatic heart mortality was more strongly related to dustfall than to any of the indexes of socioeconomic conditions. Variations in mortality for other diseases of the heart and tuberculosis were more closely associated to socioeconomic indexes than to dustfall. Such relationships should be studied further to see if a true association has been divulged, said Rumford.

He described another intra-area study, made in Chicago, to develop and test methods applicable to micro-units of a large metropolitan area. The study population was limited to white females, since residence in a particular census tract was of prime importance. Three approaches were used. In the first, mortality variations among residents of manufacturing and nonmanufacturing areas of Chicago were compared. The results suggested that those living in nearly all manufacturing areas experienced higher mortality than residents of nonmanufacturing areas.

The second approach was to compare mortality experience among residents who lived 1 mile from a large primary metals plant with that of residents living from 1 to 2 miles from the plant. In census tracts less than 1 mile away mortality was more than 30 percent higher than in the tracts 1 to 2 miles away.

The third approach was to investigate residential mortality variations in census tracts less than 1 mile from the plant in relation to prevalent wind direction. Results indicated that standardized mortality rates were highest for those living in quadrants more frequently in the path of winds blowing across the plant. Socioeconomic conditions of the area apparently contributed little to mortality variations.

In the second major category of investigations, the temporal study, it is assumed that mortality rates for selected diseases should increase or decrease with abnormal increases or decreases in actual measurements of air pollution or a manifestation of pollution, he said.

Methods used in temporal studies vary with the geographic and time units chosen. If an entire city is used, abrupt departures from the normal levels of air pollution are plotted graphically with mortality incidence. Weather factors such as maximum and minimum air temperature, rainfall, snowfall, and humidity are plotted as third variables. Usually, positive fluctuations occur in all variables when threshold levels of air pollution are reached. Therefore, the difficulty is in determining which variable fluctuated more directly with mortality.

For example, when an extreme high-pressure air mass over New York City created stagnant atmospheric conditions for a 4-day period in October 1956, cardiovascular mortality increased sharply. Graphing of the variables revealed a 2-day lag between temperature and mortality peaks in contrast to simultaneous peaks in dust count and mortality.

Temporal studies have also been done during prolonged steel strikes. Admittedly, these investigations suffer from handicaps such as a population too small for significance tests of a small percentage effect and extremely limited air pollution data. Also, there are numerous variables and conflicting factors in studies of this type.

In spite of these reservations, the Air Pollution Medical Branch hopes such studies will assist, guide, and stimulate air pollution-health studies, Rumford declared.

Effects of Donora Air Continue Uncertain

Persons who reported acute illness at the time of the 1948 air pollution episode in Donora, Pa., have demonstrated subsequently higher mortality and prevalence of illness than other persons living in the community at that time, according to Antonio Ciocco and Donovan J. Thompson of the department of biostatistics, graduate school of public health, University of Pittsburgh, reporting on a followup study made 8½ years after the episode.

Furthermore, persons who complained of more severe acute illness in 1948 demonstrate greater subsequent morbidity and mortality than persons with mild complaints, they said. There is some evidence that this greater morbidity and mortality is related to the cardiorespiratory system, Ciocco and Thompson reported. However, they cautioned, "Before these facts are hastily interpreted a more searching analysis is required."

They pointed out that many smog victims in Donora had reported chronic cardiorespiratory illness before 1948. If their histories are disregarded, the differences in the rates of illness and death among those acutely ill during the smog and those who did not experience illness then are narrower.

The 1957 data showed that even persons who denied a history of heart disease prior to October 1948 but became ill during the smog episode have had a higher subsequent morbidity rate than persons of the same age and sex who did not become ill. Mortality was also higher, although the difference is less marked. At face value, they said, it would seem that subsequent health experience is related to complaints first arising during the 1948 episode. However, there is often considerable underreporting of impairments in interview surveys, Ciocco and Thompson pointed out. If any significant amount of such understating of previous illness did occur in 1948, the 1957 findings would mean that discomforts of the smog episode only served to bring out or emphasize existing impairments.

The Public Health Service community survey made shortly after the October 1948 acute episode, covered a systematic one-third sample of Donora's households, involving 4,092 residents. Data were obtained on:

- Age, sex, occupation, residence.
- Past experience of asthma, sinusitus, heart disease, chronic bronchitis, tuberculosis.
- The occurrence of cough, nausea, vomiting, headache, and smarting of the eyes during the October pollution episode.
- The persistence of these symptoms.
- Physician and hospital service treating the ailments.

For their 1957 followup studies, Ciocco and Thompson were able to trace slightly more than 99 percent of the original 1948 group by personal interview and mailed questionnaires.

Troublesome Questions

Ciocco and Thompson had hoped to obtain an indication of the relative significance of the acute episode and chronic exposure over the years. However, no such clear relationship between illness and environmental variables, such as period of residence in the Donora environment, place of residence in the community, occupation and place of work, has been established by the study.

The findings of the study, they said, raise three central questions:

1. To what extent is the subsequent health experience of those persons who became ill during the 1948 smog related to complaints first arising during the episode or to complaints present before the episode?

2. To what extent is the greater morbidity and mortality a direct consequence of short-term massive exposure to air pollutants, or continued exposure both prior and subsequent to the episode, or a combination of the two types of exposure?

3. To what extent are the manifestations of sickness specifically related to the particular pollutants in the Donora air?

Although some of the data do point to some effects on the cardiorespiratory system, they do not provide the means for relating particular pollutants to specific systems. The lack

of knowledge as to what syndromes appear most pertinent for air pollution-health studies is vexing to all researchers in this area, Ciocco and Thompson said. The efforts and experience of many investigators will be required before the relation of continued exposure to airborne pollutants and health in large population groups is clear, they declared.

Air Pollution Control Tasks Lie Ahead

Air pollution control has scored remarkable gains in Pittsburgh and Allegheny County but much remains to be done, according to Lee Schreibeis, Jr., acting chief, Bureau of Air Pollution Control, John J. Grove, assistant director, Allegheny Conference on Community Development, and Dr. Herbert R. Domke, director, Allegheny County Health Department.

They described the industrial, civic, and social redevelopment that has accompanied effective smoke control and indicated future trends in the task of insuring cleaner air.

Continuing public and industrial support, as well as technological advances are necessary if gains are to be extended to pollutants other than smoke. Planning for the next stages requires accurate appraisal of the kind, quantity, and sources of pollutants, better techniques for control at the source, and precise, enforceable definition of control techniques in legal form in ordinances, they maintained.

Plans for control need to include the two broad categories of sources, industrial (manufacturing, service, and transportation industries) and public (automobile operation, home heating, burning trash, and other similar actions). Both types of sources, they said, contribute significantly to atmospheric contamination.

They cited R. S. Scorer's estimate that home heating and automobile and truck use caused 90.5 percent of the annual $750 million worth of damages from air pollutants in Great Britain. This estimate, while not directly applicable to Pittsburgh, they stated, demonstrates the need for caution in pointing to industrial sources as the principal offenders.

In Pittsburgh, the great reduction in smoke pollution from 1946 to 1959 was caused by the shift from coal to gas in heating homes and the shift from coal to diesel oil in transportation. The city's experience also demonstrates that, while total fuel consumption increased during those 13 years, smoke and dustfall have decreased.

The cost of control can be figured in dollars, the authors said, but it is sometimes difficult to put a price tag on irritation, nuisance, and property damage that result from polluted air. In Pittsburgh, heating an average home with approved fuels adds approximately $22.75 to the yearly heating bill. Installing collection equipment in one industrial source, an open hearth furnace, costs $600,000, and to operate the equipment, $100,000 a year. In Allegheny County, 12 out of 102 such furnaces have been so equipped.

Commenting on trends in air pollution control codes and ordinances, the authors noted that existing codes exhibit wide variations in the permissible smoke emission and permissible rates of discharge of solids. Some recent ordinances also specify permissible emission rate for certain types of process equipment. And some ordinances include requirements directed at specific industries, such as rendering, drycleaning, laundering, and asphalt plants.

The direct rewards of eliminating smoke are great, said the authors, but the indirect results of clean air—the restoration of civic pride, courage and determination in Pittsburgh—can be almost incalculable.

Food and Nutrition . . .

Dietitians Go in Where Chemists Cannot Tread

Methods of measuring what people eat, in relation to their health, were reviewed in two papers: one by Marjorie Cantoni, nutrition consultant, Dr. Ralph S. Paffenbarger, epidemiologist, and Dean E. Krueger, research analyst, all of the Public Health Service, and the other by Dr. Marjorie Grant Whiting, nutritionist, Public Health Service, and Dr. Ruth Leverton, associate director, Institute of Home Economics, U.S. Department of Agriculture.

The first dealt entirely with the nutrition phase of studies related to cardiovascular diseases. Ideally, the authors explained, the relation of diet to cardiovascular disease conditions should be appraised by lifetime studies of cohorts. Thus far methods for assessing eating habits have limited investigators to taking histories from individuals concerning immediate or recent food patterns.

Such studies either test a specific hypothesis, such as the relation of fat to levels of serum lipids, or they analyze a collection of data about diet and disease in the search for possible broad associations. Comparison of the dietary habits of persons with or without clinical disease can provide only indirect evidence, and this kind of inferential reasoning comprises the epidemiological method for the study of a disease.

Snapshot, Flashback, and Movie

Three types of comparisons are currently in use: the snapshot, flashback, and movie methods. Snapshot (cross sectional) studies compare diet of a diseased population with that of a disease-free population at a given point in time. Flashback (retrospective) studies seek information from such groups on their diets as far back as possible. Motion picture (prospective) studies follow a

Comparison of results from concurrent calculation and analysis of weighed diets

Content	Total cases [1]	Extent of agreement with laboratory findings					
		10 percent below		Within 10 percent		10 percent above	
		Number	Percent	Number	Percent	Number	Percent
Calories	378	37	10	218	58	123	32
Protein	318	97	30	170	54	51	16
Fat	259	67	26	66	25	126	49

[1] Cases taken from available Canadian, British, and United States literature; a total of 31 studies.

group with specific diet habits for comparison with a group without specific diet habits, well into the future with an eye to development of pathological conditions.

In all such studies, it would be appropriate to employ standardized measurements and accurate classification of individuals as to their diet and disease status, the authors observed, with a note of regret for difficulties in obtaining ideals. But even without precise standards, they reported useful information was obtained from personal interviews and clinical observations.

The accuracy of information about diet is checked, sometimes by questioning other members of a family and sometimes by repeating the questions at other times or in other forms. Information from interviews is also compared with information obtained by recording, and sometimes weighing and analyzing, food as served. Recall of a meal, incidentally, is easier, one group of investigators has found, if the first question asks what meat was served.

Test Tube vs. Punchcard

Both papers commented on the difficulty of accurately appraising the nutritional composition of food intake. Reliability of dietary information was the major topic of the paper by Whiting and Leverton.

A chicken and noodle dinner, they observed, might be a delight to a gourmet, but to a nutritionist it is a big question mark. As any housewife knows, the relation of chicken to noodle is not constant. When such a meal is reported to a nutritionist, it is possible only to speculate how much was protein and how much was carbohydrate, how much fat was in the chicken, and the quantity and characteristics of additional fat in the total dish.

As a check on the reliability of information concerning food intake which may be reported verbally or in writing, composites representing the day's intake can be analyzed in the laboratory for nutrient content. Even this appraisal of diet by chemical analysis, they said, has its own shortcomings, apart from the cost.

Subtle chemical changes in food may occur between the time of collection and analysis. And certain combinations of food continue to defy separation into components significant to nutrition. Also, biochemical studies, it was noted, suggest that perhaps it is not the total intake that affects metabolism so much as combinations of foods and even the order in which they are consumed. Even so, laboratory analysis, they asserted, is the most reliable method of describing the nutritive value of a meal.

Tables of average food values, like all other averages, they pointed out, cover a multitude of variables. Among those they mentioned were the effects of differences due to species, season, soil, climate, storage, and processing, as well as variations in the recipe for hash.

The comparison of the two methods of analyzing diets, one obtained by laboratory analysis and the other by calculating values of weighed portions of food, was based on available studies by various investigators in Britain, Canada, and the United States. In a bare majority of the 300-odd cases, values obtained by calculation came within 10 percent of agreement with values obtained by laboratory analysis, with respect to protein and calories. With respect to fats, such agreement was achieved in only one-fourth of the cases (see table); in nearly half the cases, calculated results were higher than laboratory results by more than 10 percent. A major error in fat calculation, they believe, is that tables of food values have failed to allow sufficiently for the amount of fat which is trimmed or melted out of meat before it is served.

For epidemiological investigations, the amount of variation found between these two methods of determining nutrient value casts doubt on the significance of differences between any two studies of less than 20 percent in the intake of calories and protein and of differences of less than 30 percent in the intake of fat.

Food Industry Tries Self-Inspection

Within the next few years, the great majority of food operators in major cities of this country will be constructively cooperating with local health departments in establishing

and maintaining proper sanitation practices, declared Max J. Kleiner and Samuel A. Coleman, directors of the Food Sanitation Consultant Service, New York City.

However, the attainment of this objective will require sustained and continued emphasis on public health education and insistence on responsible self-inspection, they said.

Self-inspection regulations grew out of action taken some years ago by forward-looking members of the food industry who employed sanitation consultants and took part in public health measures designed to reduce insanitary practices.

Some of the self-inspection codes, drafted by city and State health departments, stress only good housekeeping. Others prescribe a full sanitation program involving education of employees; personal hygiene and food-handling practices; menu analysis and food technology, including time and temperature studies; food poisoning and quality control, including chemical and bacterial analyses; rodent and insect surveys; food storage programs; maintenance and equipment information; and standard requirements concerning ventilation, safety, and water supply and sewage in rural and suburban areas.

Kleiner and Coleman divided the food industry into three groups in evaluating the extent and quality of current compliance with regulations.

Group 1 consists largely of food chains, hotels, food processors, and the majority of large restaurants. Its members give careful attention to the self-inspection program and seek to advance it. They obtain adequate equipment, competent help with layout problems, and advance approval of health departments for their plans and practices.

Group 2 is numerically the largest but in meals served does not approach the volume of food handled by those in group 1. Members of this group do not institute their own inspection programs where no official requirement for self-inspection exists, since they consider it an unnecessary financial burden, according to Kleiner and Coleman. Where self-inspection is required, they give token compliance, usually at lowest possible cost and with stress on housekeeping alone, Kleiner and Coleman said.

Group 3 is made up almost entirely of small and marginal operators who, according to Kleiner and Coleman, see self-inspection valuable only as a protective device to keep health department inspectors out of their establishments. Their observation of regulations usually consists of jotting a few minor items in a notebook, whether the conditions noted exist or not, and then dating their notes to appear they have made an inspection, Kleiner and Coleman charged.

Glamorous Food Frauds Shade Dull Food Facts

Through plausible peddlers of pseudoscience, the public is far more influenced by misinformation about diet than by the sober truth which nutritionists and physicians have to offer, according to Dr. Martha F. Trulson, associate professor of nutrition at the Harvard School of Public Health. The money wasted on food frauds, she said, is estimated at a billion dollars a year.

Citing examples of fraud and deception, with immeasurable effects on the family health, Trulson asserted a need for encouraging scientific authorities to provide honest information for the mass media, with or without the collaboration of professional writers.

She noted that one supermarket on the west coast employs a dietitian to answer questions about meal planning and the food values of specific products in an effort to offset misinformation notoriously rampant in that region.

Other informational steps recommended by Trulson include: appraisal of the economic and physical cost of food frauds; integration of nutritional information in various aspects of the school curriculum; basic instruction in nutrition at teacher's college and continuing guidance to teachers; publication of satisfactory textbooks on nutrition for a variety of grade levels; and utilization of nutritional information available from reputable sources, including materials available from the American Medical Association, the American Dietetic Association, the Food and Drug Administration, and the National Better Business Bureau.

Medical Care . . .

Medical Care Held Department Duty

Health officers were challenged by Dr. Lester Breslow, chief of the bureau of chronic diseases, California State Department of Public Health, to assume leadership in applying medical advances toward improvement of public health and to assert their competence in the field of medical care.

In voicing the challenge, he asserted that medical care has clearly become one of the most effective means to advance the health of the people, which health officers must take into account no less than sanitation, education, and other programs. The competence of health officers in medical planning and administration, and their training and experience, suit them peculiarly for service in this field, he added.

What should the health officer do about medical care? Breslow suggested a realistic assessment of the value of medical care to public health, mentioning the analyses and examples given in the 1958 report of the chairman of the APHA Technical Development Board as possi-

ble guidelines. He also urged health officers to seek technical advice on questions of medical economics, saying resolution of these issues will obviously influence the timing, nature, and scope of further governmental effort.

Appropriate action is the next step, Breslow continued. The aim should be to assure medical care of adequate quality and quantity to all segments of the population the health officer serves. In attaining this goal, the health officer, with epidemiological training, prevention as a traditional background, a primary interest in public health, and experience in community organization, is the ideal person to lead much needed investigation into the medical care needs of the whole population, the extent and quality of present services, and in the development and maintenance of standards.

Administrative responsibility for the expanding public medical care programs is being entrusted to agencies of State and local governments other than health departments, Breslow said in his concluding remarks, adding that the time has arrived for a critical review of the question by health officers.

Ambulant Patient Costs Ambiguous

An evaluation of the costs of comprehensive medical care to ambulant patients reveals the ambiguities inherent in the concept of such costs, according to Dr. George G. Reader and Miss Margaret Olencki of the New York Hospital, Cornell Medical Center.

Costs are directly affected by policy, they said. If the highest level of health is sought, thorough and complete medical care may be most economical in the long run, to the extent that prevention of disease is cheaper than cure and early treatment is usually more economical than late, they explained. At the same time, the cost of thorough examination may be all out of proportion to the need, they added. As Iago Galdston once wrote, to negative diagnosis there is no end. Moreover, a lower standard of health and care may present immediate economies which are expensive in the long run. For example, they described a patient treated summarily for an itch and epigastric pain at a cost of a few dollars, in contrast to the cost of a complete workup which might have discovered a cancerous condition.

They concluded therefore that costs depend on the level of care proposed, and the ingredients essential to a given program of care. Given these variables, they feel it is possible to determine the cost per patient or patient group.

The authors examined the charts of 719 patients, a cross section of the population of the General Medical Clinic of the New York Hospital, for 1 year. Costs of visits and services were tabulated both in terms of charges paid by the patients and expense to the hospital.

It was found that 18 percent of the patients paid nothing for services and 2 percent paid over $100. The median cost to patients was $13.

Only 16 percent of the patients cost the hospital less than $10 and 11 percent incurred an expense above $100. The median expense to the hospital was $38.

Visits to a physician accounted for the largest single share of outpatient cost, but X-rays and laboratory tests were the most expensive items.

Cardiovascular disease and diabetes create costs above average. Patients with syphilis are the least expensive. Psychoneurosis is associated with a fairly large initial expense until serious disease is ruled out but is thereafter below average in cost.

Costs also increase with the age of the patient, more so for men than for women, but it is hard to say which factor, increasing age or certain diagnoses associated with age, contribute more to expense.

An inverse relationship was found between costs incurred and economic status; the poorer patients incur the higher costs.

No general conclusion is warranted from these findings, the authors stated, but they feel that clues for further study are clearly discernible.

Blues Singers Call Doctors

Psychological reactions perceived as bodily symptoms accounted for 84 percent of the initial visits to the Massachusetts General Hospital medical clinic, according to an analysis of a random sample of 101 such visits studied by doctors on the staff.

The authors, Dr. John D. Stoeckle, Dr. Gerald E. Davidson, and Dr. Jerome L. Weinberger, are all associated with Harvard Medical School as well as Massachusetts General.

This part of a continuing study of psychological factors in illness examined specifically the frequency of requests for medical care when depression following traumatic loss is present. All patients selected for study were visiting the clinic for the first time or for the first time in 1 year. They were considered ill and were referred by community physicians, by other clinics, by the emergency service, or were self-referred. All were paying patients, and no self-designated psychiatric patients were included.

Four questions were asked:

- Were symptoms related to bodily disease or was a psychological reaction presented?
- What identifiable bodily disease was present?
- What events in the patient's life preceded illness and the decision to consult a doctor?
- What were the specific psychological reactions to these events and what relationship did they have to the illness and the decision to consult a doctor?

Psychological reactions were classified as depression, hypochondriacal, obsessional, anxiety, and conversion.

More than 50 percent of both men and women had a reaction of depres-

sion. Of the 85 patients with psychological reactions, 73 reported onset of symptoms coincided with events of traumatic loss, such as separations, real or threatened bodily injury, changes in family or job status, or death. There were no differences between men and women in type or frequency of precipitating events.

Bodily disease was found in 43 percent of all patients, and in 32 percent of the patients with psychological reactions.

This proportion of somatic illness is the same as first reported from this clinic in 1905 by Richard Cabot. The authors emphasized that both organic and psychological illness occur at the same time, but the reason for coming to the clinic was most commonly psychological.

California Physicians Sign Medical Care Contracts

The formation and operation of the San Joaquin Foundation for Medical Care were described by Mrs. Goldie Krantz, secretary of the joint welfare fund of the International Longshoremen's and Warehousemen's Union and the Pacific Maritime Association.

The 218 members of the San Joaquin Medical Society, representing 92 percent of the physicians in the county, incorporated as a foundation in 1954. Today, foundation membership includes 98 percent of the physicians in San Joaquin and two adjacent counties, Tuolumne and Stanislaus, Krantz said. The stated goals were formulation of a basis for group prepayment of medical care, an individual and family prepayment program, and the study of methods to present the desirable features of such a prepayment program to other ordinarily ineligible groups in the population. In addition, the concept was a prior countywide fee agreement based on and reflecting prevailing medical practices in the area.

The foundation is governed by a board of directors which also serves as the medical services committee of the county medical society. Any licensed physician and member in good standing of the county medical society is eligible to apply for election to participating membership in the foundation.

Krantz said that, to assure positive acceptance by the physicians and to guard against apathy, the doctors reaffirm their membership each year by signing a contract.

The foundation, according to Krantz, uses eight insurance companies, including the California Physicians Service, to underwrite medical care programs covering 20,000 people, out of a 200,000 population. The original fee schedule has been revised by setting up three fee schedules related to the income level of a given group.

In explaining the union's decision to contract directly with the foundation for medical care, Krantz emphasized the noninsurable services given by such a program. "We worked jointly with the medical society to establish our own actuarial concepts and at the same time satisfied their moral need to use the average income of the men in the group. The foundation took the risk and, in a few instances, the losses when our educated guesses on premiums were not accurate."

In citing the advantages of medical care as supplied by the foundation, Krantz said physicians are no longer bound by actuarial concepts that may have lost their applicability. Continuity of care by referral out of the area is assured, as referrals are coordinated by the foundation.

Krantz compared the San Joaquin experience with the Kaiser Foundation Health Plan in San Francisco. Hospital days per case in San Francisco were 13.7 per man for the 1957–58 year, 7.4 in San Joaquin, an increase of 11 percent for Kaiser and a decrease of 12.5 percent for San Joaquin. Office calls per man were 3.9 for Kaiser and 3.7 for San Joaquin, a decrease of 2 percent for Kaiser and a 15 percent increase for San Joaquin.

She said there are now four foundation programs operating in 14 counties in California and 6 more county medical societies have established foundations. These programs were said to vary as to local needs and reflect local practices. In some programs, patients use credit cards provided by a local banking system.

Farmer in the Dell The Doc Picks a Doc

How does a physician select medical care for himself and his family? Dr. Milton C. Maloney, Dr. Ray E. Trussell, and Dr. Jack Elinson of Columbia University's School of Public Health and Administrative Medicine, Faculty of Medicine, reported on a survey of the behavior of practicing physicians making such a selection.

Of all professionals, physicians are chosen most frequently to make judgments with respect to standards for estimating the quality of medical care. This study was based on the assumption that their most critical judgments as to quality of care would be exercised in making choices for themselves and their families.

Personal interviews with 468 physicians, approximately 88 percent of a probability sample of all members in good standing of the Medical Society of New Jersey, were used as a source. Only 40 percent had a personal physician, although 9 out of 10 said everybody should have one. And only one-fifth, or 18 percent, had seen a physician in the past year for any reason.

Physicians, the authors stated, most often choose their family doctor from among full-time specialists in internal medicine who are diplomates of the American Board of Internal Medicine and fellows of the American College of Physicians. They usually choose him because of their knowledge of his technical competence; such knowledge is based on a long-standing personal and professional relationship.

The surgeon selected by physicians, according to the data, is highly specialized. He is usually a teacher

in a medical school; he is never a general practitioner. Most frequently chosen for his technical competence, he is a diplomate of an American Board and a member of the American College of Surgeons.

Nine out of ten anesthetists selected to give anesthesia for surgery to physicians or members of their families were also physicians. In obstetrics, three-fourths of the anesthetists were physicians.

Puerto Rico Promotes Rural Health Parity

Disparities in the quality and quantity of health and welfare services between urban and rural areas are being reduced by an experiment in regionalization underway in Puerto Rico, according to Dr. Reinaldo A. Ferrer, regional coordinator and director of research, Puerto Rico Department of Health.

The project is designed to develop comprehensive and coordinated curative public health and welfare services in the Bayamón region, where 768,300 people live. It is also expected that the coordinated services will give the consumer at least a 30 percent greater return than dollars used to purchase uncoordinated services, said Ferrer.

Goals of the experiment are a two-way flow of services and technical personnel between the 15 local health centers in the region and the base regional hospital in Bayamón, continuing education for all health care professionals working in the region, and the growth of technical consciousness of health and welfare needs among the region's rural and urban consumers.

Ferrer outlined the progress that has been made toward each of these goals since the regionalization scheme was started in 1956, when the Department of Health of the Commonwealth of Puerto Rico established the Regional Office for Coordination and Research.

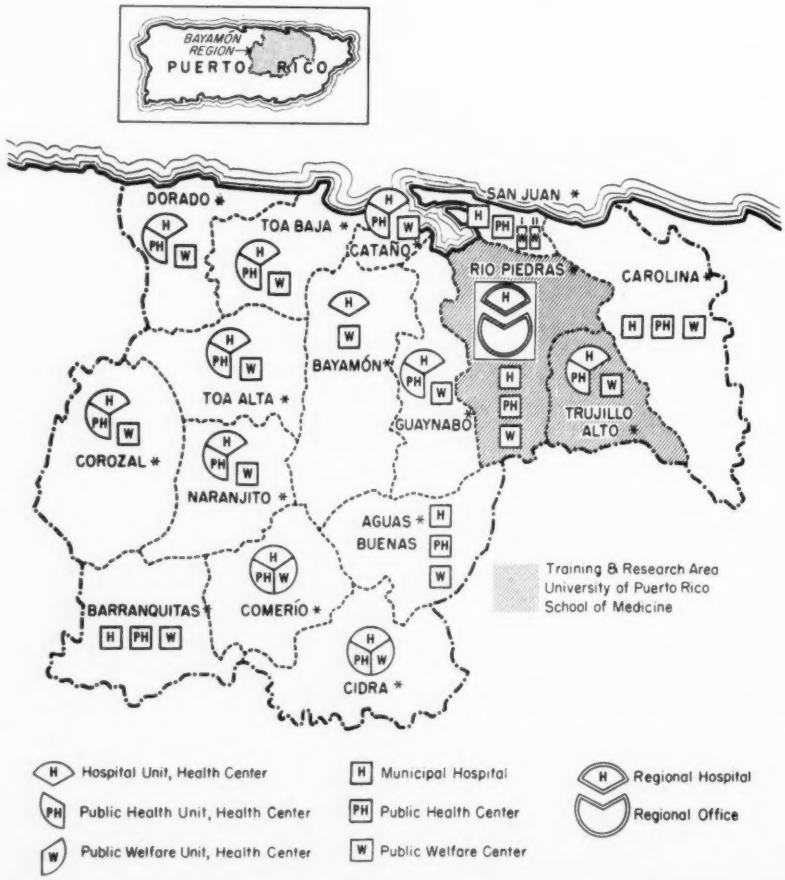
Although legislation passed in 1947 provided for a health center in each of Puerto Rico's 72 municipalities (34 have been built), and put the hospital unit (1 bed per 1,000 inhabitants) and health and welfare units under a single roof, the three units in each municipality continued to be administered independently and lacked specific standards for organization and management.

Consequently, the first task of the regional office was to compile an operating procedures manual that combined, codified, and amended the previous regulations. Standards for organization and management for each type of service within the formerly separate units also had to be prepared. Standards for 15 services have now been established, Ferrer said. "A Guide for the Opening of a New Health Center" was also found to be necessary and has been issued.

By 1958, all 15 units in the Bayamón region, with a proportionate number of former Commonwealth Department of Health staff, were decentralized to the regional level. Ferrer stated that the flow of services and technical personnel from the municipal centers to the regional base hospital and back to the municipality has observably reduced inequities in the health and welfare services available in rural areas of Bayamón, as compared with those available in metropolitan San Juan.

With the regionalization now in effect, chiefs of clinical services of the base hospital regularly visit the municipal centers to conduct special clinics such as pediatrics or radiology, or to perform surgical procedures. Patients now accept confidently the local center's services and no longer demand to be sent to the base hospital.

Local health centers in the Bayamón Region, Puerto Rico



Obstacles in progress toward the second goal, continuing education for professional persons, have been financial, Ferrer noted. Consultative services by the circuit riding chiefs of clinical services have not proved a satisfactory educational tool for the local centers' physicians. Therefore, systematic graduate instruction at the base hospital on Saturday mornings and longer residencies at this hospital are being tried, but both are hampered by lack of funds to pay substitutes for the absent local physicians.

Initial steps have been taken toward the third goal, to develop a technical consciousness of the needs for health and welfare services among consumers. Creation of local health councils is being stimulated by joint efforts of the local center staffs and the research staff of the regional office. In some instances, the councils have been made advisory boards with regular meetings and increasing responsibilities.

In one municipality, the augmented council prepared evaluations of community resources and facilities, communicable disease control, maternal and child health, and environmental sanitation. They used appropriate sections of the APHA "Guide to a Community Health Study" and the evaluation schedules, adapted to Puerto Rican circumstances. Their final reports and recommendations were given to the medical director of the local center. It is planned to apply the evaluation schedules to the hospital and welfare fields, and eventually use them in community education of the need for these services throughout Puerto Rico.

Consumer-Controlled Care Now Permitted In Ohio

Consumers may now organize and control medical care programs through closed panels or groups of physicians in Ohio, reported Glenn Wilson, manager of medical care research, Nationwide Insurance, Columbus.

Other departures from existing legislation contained in a new law effective October 1, 1959, were cited. Wilson mentioned that the range of health service offered by such a plan may now cover physicians' service in the home, office, hospital, and nursing home. Nonphysicians' hospital and nursing home care may be included, and dental care as well.

Wilson said the law provides that payments to professional personnel by the corporation may be on any terms mutually agreeable, and that large cash reserves are not initially required. Some States require as much as $60,000 in cash to start such a program.

Broad power is given by the law to the superintendent of insurance to license and supervise medical service plans. One of Ohio's legislators, in discussing the enactment of the law, quoted Victor Hugo, "Nothing in the world is so powerful as an idea whose time has come."

Private Patients Get Social Services

Requests for social services for private patients come more often from the patient or a relative than from the patient's physician, according to a continuing evaluation of such requests at Beth Israel Hospital in Boston. Mrs. Beatrice Phillips, director of the social service department, and Jerry A. Solon, director of the medical care studies unit, reported on this and other early findings.

Any patient, full-paying or medically indigent, may experience social and emotional effects from illness, the authors stated, and this principle led to formal arrangements extending social services to private patients at Beth Israel upon request and for a fee. Factors which may deter private patients or their doctors from requesting or using social services, they said, are lodged in traditions of medical practice, social work, hospital organization, staff relations, and general sociocultural practices and values.

Fully one-half of the requests originating with either a patient or a relative were concerned with homemaker arrangements and financial need. These difficulties, the authors observed, are only infrequently presented in requests by physicians. Requests by physicians were most frequently concerned with planning for discharge of the patient.

Requests were received in behalf of patients with a wide variety of diagnoses. Among chronic conditions, heart diseases and neoplasms predominated. Pregnancies accounted for another substantial group.

Variety also marked the length of stay of patients, which ranged from 3 to 77 days. All age levels were represented, including a noteworthy number of older patients.

Many questions are posed for this continuing analysis, the authors concluded, adding that the most basic are questions relating to how social service is evaluated by physicians and patients, and, conversely, how social workers look at giving social service to private patients.

Extension Service Aids Rural Health

In teaching farmers good health practices, full use of the Cooperative Extension Service of the U.S. Department of Agriculture is advocated by Dr. Donald G. Hay and Dr. Evlon J. Niederfrank, associated with the Department.

Stating that the function of the Extension Service is basically education geared to the needs and problems of people living on farms, the authors underscored the long and successful history of this Federal educational effort. They also stressed the guiding principle of extension workers, which they said has always been "helping people to help themselves."

Reflecting what the authors described as the "growing health consciousness of the American consumer," some of the increasing demands from the farm community for health services were outlined. Home

demonstration clubs ask for lessons on home care of the sick, a clinic on well-baby care, a demonstration of farm and home safety, and lessons on what to look for in selecting health insurance coverage. The 4–H clubs want physical examination of their members, information on surveying for farm accident rates, aid in encouraging the youth of the community to use fully a poliomyelitis vaccine clinic. A farmer asks to have his dairy herd tested for brucellosis.

Physicians and dentists in private practice and public health workers were listed by the authors as key people in the Extension Service health education program. Valid information is thus channeled to rural residents. As questions are raised, the extension staff relays the queries to specialists in the field, and arranges for dissemination of the desired information to the interested groups.

Close cooperation between health care personnel, organizations and agencies, and Extension Service staffs was urged by Hay and Niederfrank. They described the existing ties between the Service and medical schools in educational leadership in health care programs, in strengthening community health services, and in community-wide efforts toward broader use of existing resources. As an example of this cooperation, the authors mentioned a project in cardiovascular disease among farmers involving Purdue University and using the Indiana Extension Service, Indiana Heart Foundation, the Indiana University Medical School, the State Board of Health, and practicing physicians. The project is focused on the work requirements and improved work methods which may be used on a farm operated by an identified cardiac worker. Possible alternative plans for organization and operation of the farm business, graded according to the physical capacity of the farmer, are planned with and not for the impaired worker, they said.

In 1959, there were full- or part-time Extension Service specialists in charge of specific health education programs in 18 to 20 States. In 1946, there were only three.

Fresh Concepts Outline Medical Care Patterns

The development of a conceptual framework within which various patterns of medical care can be viewed in a rational, orderly, and analytical way was reported by Jerry A. Solon, director of the medical care studies unit, Dr. Cecil G. Sheps, general director, and Dr. Sidney S. Lee, director of clinical services, Beth Israel Hospital, Boston.

In their study, supported by a Public Health Service hospital facilities research program grant, the three concentrated on the outpatient department of their hospital, but reported that the study methods are equally applicable to any medical care setting or to the population at large.

The role of the hospital outpatient department has long needed to be reappraised in the light of modern conditions, the authors said. Medical care used to consist of a simple one-to-one relationship between the patient and his doctor, but scientific specialization and growth of many varied types of care programs have made medical care much more complex today, they pointed out.

In the Beth Israel study, they sought to devise a method which would give a real sense of patterns of use and would relate the part played by the outpatient department to the total medical care of its patients.

Patients, they found, use a great many varied combinations of sources of care. Some obtain the full range of their care at Beth Israel using its outpatient clinics, the emergency unit, and occasionally ward-hospitalization. Other patients depend almost entirely upon private physicians but come to a single Beth Israel clinic for some confined purpose. Some use other hospitals and clinics. Patients continue their uses of the different sources in numerous ways.

The collection and analysis of such facts will help to reevaluate outpatient departments and assist in planning services and facilities, they said. Some key concepts of medical care patterning have emerged from the study, permitting them to obtain a sense of the person's pattern out of the maze of details. These analytical concepts enable them to:

- Delineate the patient's "current pattern of medical care," that is, the sources of care actually used during the past year and the sources he plans to use if need arises.
- Identify his "central source of care," for example, the facility or physician among these sources most important to him, or the source to which he looks for his directional signals.
- Describe the "role of his central source of care." It might be a general medical function, or a specialty service important to his well-being, perhaps a cardiologist if he is a heart patient, or a psychiatrist, or a physician-friend who may not treat the patient but will advise him.
- Finally distill from all this information what they call the person's "configuration of medical care pattern." This extracts only the essentials of his pattern of care from the whole range of his medical services.

With this framework for delineating the patients' medical care patterns, it is planned to analyze the place of the outpatient department in those patterns.

The Streetcar Named Medical Care

Medical care for members of a union can be successfully integrated into a community health program, according to Walter J. Bierwagen, president of the Amalgamated Association of Street, Electric Railway, and Motor Coach Employees of America. He cited the experience of the Transit Employees Health and Welfare Fund, established by agreement between the D.C. Transit Sys-

tem, Inc., and the National Capitol Local Division 689 of his union, in Washington, D.C.

Prepaid comprehensive medical and surgical care and hospitalization is now given to approximately 10,000 people, the employees of the transit company and their dependents, under a contract with Group Health Association, Inc., which has been operating in the Washington area since 1937. The contract became effective April 1, 1959.

The fund, originally established by agreement between labor and management in 1952, operates under the direction of a board of six trustees, three from labor and three from management. The agreement was amended in 1956 to provide for the establishment of a union health center for medical services as well as life, sickness, disability, hospitalization, and surgical insurance coverage previously supplied by the fund.

Three major possibilities were considered: to contract for expanded Blue Cross-Blue Shield coverage; to build and operate a health center for members and their families alone; or to contract with Group Health Association. The Group Health Association was selected as the most desirable, Bierwagen said. Expanded Blue Cross-Blue Shield, he stated, offered limited medical coverage and fees were not fixed firmly. The idea of a health center for members only was given up reluctantly because of delays in giving service and difficulties in doctor recruitment.

As for the Group Health Association, a cooperative society with 22,000 members, its current facilities were strained and obviously inadequate to handle an increase of 10,000, Bierwagen said. Financing was not readily available to permit expansion of these facilities. Participants in the GHA program were concerned that the quality of medical service would deteriorate because the efforts of the existing medical staff would be diluted and newer, less experienced doctors added. Medical staff members were concerned by the possibility of meeting board requirements in the several States from which patients are drawn.

Nevertheless, medical care service has been accomplished, according to Bierwagen, with early evidence of success as a result of a completely cooperative effort. The transit employees' fund financed a labor-management health center as an adjunct to the Group Health Association in Takoma Park, Md., at a cost of approximately $275,000. Contract negotiations, although long and complex, have been completed. Under the contract, extra fees for special services such as X-rays, basal metabolism tests, physical therapy, blood transfusions, and the like, the so-called deterrent fees, are not charged. The union's position was that these fees depart from the basic concept of prepaid medical care.

The fund pays Group Health, Bierwagen said, $4.18 for each beneficiary, adult or child, per month. The fund also pays all the maintenance charges for the new health center and is reimbursed by Group Health at the rate of 19 cents per fund beneficiary per month, the amount budgeted by GHA for maintenance of its health facility. An active employee with family pays the fund $8.33 per month and management matches his contribution. Lesser contributions are made for single employees and by pensioners. Although the medical services provided pensioners and their families are the same as those given active employees, the company does not match the pensioner's contribution. The contract between the fund and GHA is initially for a 2-year period, during which time title to the labor management health center is vested in the fund. Fees and benefits will be reexamined at the end of the first year.

But Bierwagen stressed that the greatest benefit is the pattern of faith now emerging among union members which permits them to use the plan with assurance that medical care is fully prepaid.

Health Insurance Plan Analyzes Complaints

Subscribers to the Health Insurance Plan of Greater New York, in response to encouragement from management, have been quick to voice dissatisfaction, ask questions, and make suggestions on medical service, reported George H. Weltner and Dr. Walter J. Lear, both associated with the plan.

Handling subscriber complaints against the plan's medical groups is the highly sensitive activity of the division of claims and subscriber service which Weltner directs. Dr. Lear, associate medical director, represents the medical department.

The plan is described by the authors as a non-profit, community-sponsored, insurance company supplying 550,000 subscribers with comprehensive physicians' services and, for many hospitalized patients, laboratory, X-ray, and auxiliary therapeutic services. About 1,000 general practitioners and specialists in 32 autonomous medical groups supply these services under contract, usually in their private offices.

For more than 10 years, complaints by subscribers directed to the central office of the plan have been counted and coded "with the obsessive zeal of a hypochondriac recording his symptoms," the authors stated. The rate of complaints is now fairly constant at 3 a year for each 1,000 subscribers. In the first 2 years, 1947 and 1948, this rate was eight and five respectively.

The most frequent complaints relate to the attitude of physicians (23 percent of the total) and to alleged superficial diagnosis and treatment (20 percent). Third in frequency (17 percent) is coded as "refused home call." Other complaints are "delayed or inconvenient appointments," "failure and delays in emergency service," "poor telephone service and other communications problems," and "wrong diagnosis or treatment."

Almost one-half of the complaining subscribers call a physician not

associated with the plan as a secondary action and most of these ask the plan to pay for the unauthorized call. In 1958, these instances, called complaint-claims, represented 43 percent of all complaints received, the authors said.

An analysis of 1958 complaints by the authors showed 58 percent against family doctors who provide 44 percent of the physician services; 11 percent against pediatricians, providing 12 percent of the services; and 31 percent against other specialists, providing 44 percent of the services.

Handling of Complaints

Complaints to the central office of the plan average seven each working day, Weltner and Lear reported. Skillful interviewing by trained subscriber service representatives frequently eliminates the need for further action. A transfer to another family physician is sometimes useful in dispelling possible antagonisms against the plan itself.

But the complaint-claims, representing about 40 percent of all complaints received, involve requests for reimbursement, the authors emphasized, and cannot be resolved by conversation. Complete information on each complaint-claim is forwarded to the administrator of the medical group concerned. Contract stipulations, according to the authors, require each medical group to supply answering reports. Both statements (the subscriber's and the group's) are then reviewed by the medical department of the plan and the representative assigned to the case. If a solution is not found at this point, the authors said further review is made by obtaining additional evidence, the testimony of impartial specialists, or by referral to a claims committee composed of the vice president of the plan, a medical department physician, the director of claims and subscriber service, the insurance underwriter, and the plan's legal consultant.

The authors reported that 30 percent of all complaint-claims are approved, based on administrative failures, the assumption that the subscriber should be given the benefit of the doubt when evidence is mixed, and, in a few cases, a clear conviction that appropriate medical care was not given.

Preventing Complaints

Thorough orientation of new subscribers lessens the higher complaint rates characteristic of the period of early adjustment of prepaid medical group practice, the authors believe. The authors described meetings held before the effective date of coverage for new subscribers and welcoming talks shortly thereafter.

Other steps in complaint prevention outlined were mailing of instructional pamphlets by the plan and a welcoming letter from the medical group which invites the new subscriber to select a family physician; the policy of tactful interest of the subscriber service representatives in answering the questions of about 40,000 customers a year; health education meetings and bulletins; and the efforts of the individual medical groups to minimize their own complaint score.

Complaints, Weltner and Lear stated, frequently have constructive administrative results. They cited the adoption by the plan of a uniform schedule of charges for injectable drugs and biologicals after numerous subscriber complaints about variable and "excessive" charges.

The authors stated in conclusion that the voice of the patient, generally muffled in the traditional practice of medicine, is clearly heard in the plan, is recorded, played back slowly, analyzed, and often translated into practical proposals and actions.

Public Health Nursing . . .

Public Health Nurses Furnish Vital Facts

Despite difficulties in communication, public health nurses brought some 400 items of significant new information to the attention of the New York Hospital staff, according to Doris R. Schwartz, public health nursing coordinator.

A systematic study was made of a 50 percent random sample of referrals for public health nursing services initiated in the general medical clinic over a 1-year period, Schwartz reported. This study of 184 cases attempted to assess both the public health nurse's usefulness to patients as a result of the referral and the quality of communication in the referrals.

Information dealing with the patients' ability to function and not previously recorded in their charts was supplied by public health nurses, Schwartz said. Physical symptoms were often identified and mental or emotional problems revealed. Some social problems reported by the public health nurse were referred to the social service department.

Health problems of other members of the household were brought to the hospital staff's attention, and many of these persons then came under the hospital's care. Observations on the impact of the patient's illness on other members of the family frequently were reflected in the physician's treatment plan.

Schwartz stated services requested were general nursing care; instruction in patient care; dressing changes, injections, or demonstrations of exercises; supportive health supervision; and evaluation of the suitability of a home situation.

In 53 cases, Schwartz recounted, 101 patients' problems with which the public health nurse might have been helpful were described in the hospital charts, but they were not mentioned in the original referral. Discrepancies were noted in 25 instances between orders written on the interagency referral and those in the chart.

Out of 87 specific requests from the public health nurses, the hospital answered 43. Although they invariably returned a written reply with other information on it, community agencies replied to the query in 67 of 83 cases, and the hospital remained without the information in 16 instances.

Schwartz described New York City's uniform referral system and the forms used. She suggested that staff education programs in both the hospital and community agencies be used to eliminate communication difficulties in the use of referral forms.

Research Changes Prenatal Classes

More practice in the physical act of caring for babies in prenatal classes is recommended by Ethel Donny, maternal and infant care consultant, and Mabel Reid, statistician for the Visiting Nurse Service of New York.

This change in VNS classes resulted from a study, part of a 3-year project, to improve the competence of nurses in work with young parents. Questions designed to discover what the prospective parents were like, how much they learned in VNS classes, and how they adjusted to their new role as parents revealed that attendance was lightest among the least privileged.

Classes now are offered only in middle-class neighborhoods where attendance remains consistently high. They found that the women who attend classes are relatively well educated, have had little or no contact with babies, and are in close contact with their physicians.

As a result the classes provide additional opportunities for practicing baby care to supplement the individual baby-bathing practice session arranged for each mother before or after class. Parents are encouraged to diaper dolls rather than watch the nurse demonstrate different types of diapers. The feeding bottle is passed around to parents to practice its use.

The authors declared they were surprised to learn that the terminal heating method of sterilization, the only method taught in the class, was used by only half of the women who prepared formula. Now they discuss and demonstrate the aseptic method as well, stressing cleanliness but deemphasizing sterility.

Half the women who attended classes had difficulty adjusting to their new role during their first week at home with the baby, and described it as an unhappy experience. These mothers were particularly upset by the baby's crying. The authors believe that a mother who becomes familiar with a crying baby in the hospital, while she is in a safe situation, may not be so disturbed when her baby cries at home.

Instead of suggesting that parents hire a housekeeper or infant attendant, VNS instructors explain the actual tasks of a new mother and encourage expectant parents to make their own plans for coping with them.

According to Donny and Reid, women who come to classes and their babies have private medical care. When mothers were interviewed between 4 and 8 weeks after delivery, the infants had already been seen by the physician an average of two times since leaving the hospital. An average of 3.4 calls had been made to the doctor for specific advice, generally concerning feeding. In deference to doctors' differences as to when solid foods are to be introduced, the authors said, they concentrate on how to do it.

Group instruction as they have developed it, Donny and Reid stated, does not attract parents from the lower socioeconomic levels or new immigrants, the families with the highest perinatal mortality. In areas where attendance was consistently low, prenatal classes have been discontinued in favor of more antepartum home nursing visits. All nursing time available for maternity work in these sections of the city is spent in home visits to encourage women to register for early prenatal care and keep their clinic appointments and to teach good nutrition and hygiene, with teaching adjusted to each mother's individual needs.

With respect to the need, they concluded that group instruction as an alternative to individual teaching, is a dubious economy in prenatal education.

Home Nursing Lightens Chronic Illnesses

Home nursing and other health services organized for patients discharged from North Carolina Memorial Hospital in 1953 have broadened into a demonstration of unusual opportunities for limiting disability and chronic disease. This conclusion was reported by Dr. William L. Fleming, Shirley Callahan, and Dr. S. L. Warren, respectively professor, instructor, and assistant professor in the department of preventive medicine at the University of North Carolina at Chapel Hill.

Beginning with a teaching grant from the Commonwealth Fund, the home health service arranged for medical students in their fourth year to provide medical care to selected homebound patients living within 10 miles of the hospital, and bedside nursing services were arranged through the district health department.

As it became known that such home services were available, the supervising nurse of the service began to receive requests for assistance to antepartum cases. At the same time, demands increased for aid to nonmaternity cases, some of them outpatients and others on discharge from the hospital.

In light of this demand, in 1955, health officers for the State's 100 counties were asked if they could provide instructions and bedside nursing services in the homes of discharged patients, and health officers for departments covering 95 counties responded. Nearly all offered counseling services, but their estimates of availability of nursing services varied considerably.

Much of the variation resulted from their different anticipations of

the special services that might be required. In practical experience, it was found that reasonable requests for bedside nursing care have been seldom refused by a local health department.

Referrals are initiated by any professional person in the hospital, but are completed by the attending physician and coordinated by the supervising nurse.

Although most of the new referrals, in the range of 2 or 3 a day, have been maternity cases, the proportion of patients with chronic illnesses on the referral list is rising. Of 445 nonmaternity patients referred in 1958, 143 had CVR conditions, 61 diabetes, 31 paraplegia, 30 neurogenic and mental illnesses, and 28 cancer.

The percentage of referrals for home evaluation has also been increasing. For example, home evaluation is used by the pediatrics service in behalf of the nephrotic or rheumatic child.

It is believed that home evaluation can reduce failures to keep clinic appointments, disease complications, and readmissions. It also helps in planning a regimen within the patient's capacity.

The opportunity for home service at the same time makes it practical to expedite the discharge of patients with amputations, surface ulcers, colostomies, tracheostomies, strokes, and arthritis.

The authors of the report recommended that health departments not only place more emphasis on providing home nursing services but that they also should join with the community hospital in providing certain laboratory services, such as culturing streptococci, so as to assist in the correct use of antibiotics.

Nursing Budget Uses Activity Time Data

Work measurement and performance budgeting in public health nursing are being used by the bureau of public health nursing of the Los Angeles County Health Department to support budget requests for nursing personnel, reported its director, Olive M. Klump. These techniques have enabled the bureau to compute the anticipated volume of work to be performed at the standard which has been determined by the professional staff.

In the budget process, Klump said, health department nursing services are listed in major categories and totaled. Nursing time of all district nurses reported for each category for the period selected for study is tabulated. The total number of units in each category, divided into time consumed, gives a figure for the average time per unit.

Indirect time, Klump explained, is analyzed and tabulated into arbitrarily defined categories which include inservice training, supervision, public relations, health education, cleaning the nurse's bag, attending professional meetings, and preparing field, time, and mileage reports. Indirect time reported for all district nurses for the period studied is totaled, and a percentage ratio of the indirect to the direct time computed.

In projecting budgeted time, indirect time is added to direct time, after determining the proportion of indirect time to direct time for each district.

Data obtained in this manner have been used to indicate the number of nurses needed in each existing district, for new districts, and for new or changed programs, Klump stated. The data also bring out variations among districts. As a result, certain nursing activities are being reexamined.

Klump pointed out that quantitative appraisal of nursing services is not sufficient in itself. Services and the time allowed vary with need and conditions, and with standards of care. When only top priority home visits are made and when the time per visit is the only consideration, she said, the volume and quality of service will be inadequate.

Although the budget process is quantitative, not qualitative, Klump affirmed that it does encourage the examination of performance standards which can be used in conjunction with quantitative data.

The procedure was adapted from the field of industrial management, but it is patterned after another study in public administration in Los Angeles County, Klump declared. The procedure is practical, acceptable to management, and facilitates planning for nursing services, she concluded.

Maternal and Child Health . . .

Early and Cluster Testing Urged for Phenylketonuria

To wait for initial retardation symptoms suggesting phenylketonuria in infants is to wait too long; treatment must begin in early infancy to avert irreversible brain damage, asserted Dr. Willard R. Centerwall, Dr. Robert F. Chinnock, and Albert Pusavat, of the department of pediatrics in the School of Medicine of the College of Medical Evangelists, Los Angeles, Calif.

They advised screening all well babies, as in California, where health departments participating in well-child conference testing are checking the majority of infants seen by health departments in that State.

Phenylketonuria (PKU), also known as phenylpyruvic oligophrenia, is a recessively inherited disorder in the metabolism of the amino acid, phenylalanine. It is characterized by high phenylalanine blood levels and the presence of phenylpyruvic acid (a phenylketone) and other metabolites in the urine. Infants with PKU are normal at birth, but within a few months they begin to show signs of mental

retardation; and by 2 or 3 years of age more than 90 percent of these children have progressed to the imbecile-idiot level of mental deficiency. Between 0.5 and 1 percent of the institutionalized mental defectives in this country have PKU. Interpolating from this incidence in the defective population, it is estimated that PKU probably occurs once in about 20 thousand live births. It is possible that it is even more common than this. About 200 PKU infants are born in the United States each year.

The monetary savings to the taxpayers when any such child is spared a lifetime admission to a State institution for the mentally retarded is about $100,000 for that one child. If each such infant were to be discovered early and thus prevented from becoming mentally retarded and institutionalized, the theoretical savings to the Nation's taxpayers for only 1 year's successful detection would be in the neighborhood of $20 million spread over the lifetime of these children.

The bulk of the report discussed technical aspects of screening and testing. On detecting phenylketonuria, they suggested, the families and physicians should be alerted to assure early diagnosis of siblings and cousins. Screening mentally deficient populations together with family orientation and sibling testing found four new cases in a recent 3-month period in southern California.

A Central Registry

A central registry for phenylketonuria will encourage recognition of every case of this disease in a given area, in the opinion of Dr. Richard J. Allen, assistant professor of pediatrics, University of Michigan Medical School, Ann Arbor, Mich. He urged a cross-checking system between the family physician, the pediatric diagnostic clinic, and the State mental institutions so that all infant examinations and the evaluation of all neurologically defective children are accompanied by routine urine tests to identify phenylketonuria. Fifteen patients were detected this way in the past 3 years in the university's pediatric department.

Efforts to detect this disease must be simple, easily interpretable, and not too costly because present statistics indicate phenylketonuria is a rare disease. Testing only infants in well-baby clinics may require many years to identify even a single case, depending on the population of that clinic. Identifying older patients has been a worthwhile study, Allen said, since the recent survey of State institutions in Michigan has detected 34 cases. Family surveys may then identify infants with the disease at an age when treatment is most effective.

In discussing testing techniques, Allen remarked that there are several sources of error, particularly when using the ferric chloride method. False negatives may result from insufficient amounts of ferric chloride added to the urine while false positives may be due to color changes associated with various drug ingestions. Some errors may be avoided by diluting the urine specimen with a large volume of distilled water before adding ferric chloride. In general, the diagnosis is easy, particularly with the commercially prepared paper strips but also with chemicals (ferric chloride solution) usually found in the physician's office.

Cystic Fibrosis Strains Family Resources

The increasing numbers of children and young adults with cystic fibrosis present difficulties new not only to physicians but to their families and communities, stated Dr. Dorothy H. Andersen, department of pediatrics, Columbia University College of Physicians and Surgeons, New York City.

She explained that earlier diagnosis and informed therapy have meant prolonged life for patients with this relatively common congenital disease. Twenty years ago, most died in infancy with malnutrition and bronchopneumonia. Andersen called the disease a public health concern and explained why the patients and their families need medical, financial, educative, and supportive help.

In cystic fibrosis of the pancreas or mucoviscidosis, many or all of the exocrine glands function abnormally. The glands chiefly affected (each in somewhat different ways) are the mucous glands of the bronchi and nasal passages, the sweat glands, and the digestive glands. The most common clinical results are chronic bronchitis, malnutrition or poor weight gain, steatorrhea with loss of fat-soluble vitamins, and susceptibility to heat prostration. Respiratory infection produces the most distressing symptoms and is the usual cause of death.

A physician or a clinic familiar with the disease, able to instruct the child's mother and provide continued support, must supervise the immediate care of the patient. The child needs a planned diet, daily vitamin supplements, salt tablets, and, usually, antibiotics of some sort.

The mother faces many questions. Are associations with other children in school and at play worth the risk of exposure to infection or is isolation of the child a greater risk? How much exercise should the child have? How should she explain the child's condition to neighbors and relatives?

The patient, as he reaches adolescence, wonders how long a life he should plan for. Should he marry? What kind of work can he do?

The financial cost of the disease, aside from hospitalization expenses, has been estimated at $1,000 to $1,500 a year for drugs, X-rays, trips to the clinic, and high protein foods. Families with moderate incomes sometimes deprive other members to feed the patient, and some sell their homes to pay the bills.

The genetic implications of the disease are troubling. Parents face the question of having additional children, and the present status of knowledge of the disease offers no

definite answers. The genetic pattern of cystic fibrosis is not clear, and the basic metabolic defect which is inherited is, as yet, unknown. Whether dominant or recessive, the trait is irregular in penetrance and expression. It occurs among siblings with the frequency of a recessive trait. Sex distribution is equal. Occurrence is not related to age of parents, sibling order, or economic status. It has been calculated that if cystic fibrosis is recessive, 1 in 20 of our population carries the gene, which seems improbable, according to Andersen.

Frequency of occurrence has been estimated as of the order of 1:1,000 live births. The number of living patients or the number of deaths annually from cystic fibrosis is not known. Babies Hospital in New York City sees 50–60 new cases a year, is following 250, and Boston Children's Hospital sees about 100 new cases a year. There were an estimated 2,500 hospital discharges (1 in 7 discharged by death) with this diagnosis in 1957.

For all these reasons, families feel isolated by what seems a unique dilemma. They often resent their physicians' lack of knowledge which may have delayed diagnosis and are frustrated in attempts to obtain assistance from public agencies.

Andersen suggested, in addition to more research, wider dissemination of what is known among physicians, schools, and public health agencies. Pediatricians and recent medical school graduates are best informed, but many physicians know little more than the name of the disease, she said. With informed public health centers, school nurses, and social service agencies, families with affected children might be better provided with counsel and support. Counseling services for the increasing number of adolescents and young adults would be invaluable, she said.

Some States have eased the financial burden of the disease; for example, in Connecticut the cost of drugs and vitamins is borne by the State. In many States, the laws exclude patients with the disease from receiving State aid.

Additional knowledge is being sought. The Children's Bureau, Department of Health, Education, and Welfare, is studying the occurrence of the disease. The National Institutes of Health has recently established a research group. The National Cystic Fibrosis Research Foundation, organized by parents, is raising funds for research and education. Clinics in a number of children's hospitals are absorbed in the medical care of patients and in basic research.

Lower Chloramphenicol Dose for Infants

Factors in the rising neonatal mortality rate in Baltimore in 1958 included lack of prenatal care, the possible existence of a pathological agent in hospital or community causing febrile illness in mothers, and, possibly, excess dosage of chloramphenicol in the newborn, according to a recent epidemiological study reported upon by Dr. M. Kathleen Carney, instructor in public health administration, Johns Hopkins University School of Hygiene and Public Health.

Currently, for the first time since national mortality statistics have been available, there is a nationwide rise in neonatal mortality rates. The rise in Baltimore, most marked among Negro and premature infants, began in 1957, with the rate going from 22 per 1,000 live births in the preceding year to 26 per 1,000, a difference accounting for an excess of 118 neonatal deaths in 1957. The elevation persisted in 1958 and through the first 6 months of 1959.

The Baltimore City Health Department reported that the increased mortality was limited to the neonatal period. The death rate per 1,000 live births for infants aged 28 days through 11 months remained almost stationary, and there was also no parallel rise in fetal deaths. The increase in actual number of deaths was most marked at 24 hours through 6 days of age. There was no rise in natal day mortality. Ninety-four percent of the neonatal deaths occurred prior to the infant's initial discharge from hospital of birth. The rise was not uniformly observed in all hospitals of the city. Primarily, according to the department, it was a problem of the Negro infant.

The study was made in 1958 at two Baltimore hospitals with 50 percent of the Negro births in the city. Hospital A is the municipal hospital, in which nearly 40 percent of all Baltimore Negro babies are born. Overcrowding and understaffing exist on both obstetrical and nursery services, Carney said. Hospital B admits both private patients of staff physicians and ward patients who have been followed regularly in the hospital obstetrical clinic. It also serves as a referral agency and receives a considerable proportion of patients with complications and greater prospect of poor fetal outcome. Overcrowding is not so great here, according to Carney.

In both hospitals, obstetrical records of all mothers experiencing live births in the first 4 months of 1958 were analyzed and compared with control periods in 1956, the most recent year of significantly lower neonatal mortality. All recorded neonatal deaths during the first 9 months of 1958 were studied in detail including evaluation of all available necropsy data.

At hospital A, an increase was noted in numbers of patients failing to obtain the prenatal care offered by the city health department.

Here also was noted an increase in incidence of mothers' postpartum puerperal morbidity which may have affected the health of their infants. Data from the study concerning the incidence of fever after delivery led to the hypothesis, Carney said, that during 1958 there was possibly present in the obstetric department or community an agent (perhaps bacterial, viral, or other) which produced a febrile reaction in certain mothers in the postpartum period and may have been responsible for

the neonatal death of some of their infants. Such an agent was not detectable by routine laboratory studies performed on febrile mothers.

A change in age distribution of neonatal deaths at hospital A with an increase in proportion of infants becoming ill and dying after the first 48 hours of life led to investigations of antibiotic dosage of all infants surviving for 24 hours but dying within the neonatal period. Only two statistically significant differences in antibiotic therapy were found between 1958 and the 1956 control period, Carney reported. These involved decrease in use of streptomycin in prematures in 1958 and an increase in use of chloramphenicol in doses in excess of 50 mgm./kgm./24 hours in prematures in 1958.

The chloramphenicol dosage was of particular interest, Carney said, in light of recent reports suggesting that doses in excess of 50 mgm./kgm./24 hours might be toxic and at times fatal to small infants because of poor ability to convert and excrete it. Evidence was insufficient to be conclusive on this point, but, Carney said, "there is reason to consider this factor a lead." Since the report, the standard therapeutic dose has been altered to 20 mgm./kgm./24 hours, and coincidently there has been a significant decrease in the mortality rates of premature infants weighing over 1,500 gm. at birth.

At hospital B, nearly 70 percent of the rise of neonatal mortality could be explained by an increase in number of immature (less than 1,000 gm.) births and deaths. This is an apparent consequence of a particular interest in the treatment of habitual aborters at this institution, Carney explained. There was no evidence to suggest any significant increase in deaths due to infection or other illness acquired in the nursery at hospital B.

Economic Status Colors Birth Data

Changes in characteristics of the population of the District of Columbia, with relative gains in the low income group, clearly reveal the impact of economics on birth data, according to Dr. Ella Oppenheimer, chief of the bureau of maternal and child health, D.C. Department of Public Health.

Premature and illegitimate births and neonatal mortality have increased and prenatal care has decreased in recent years, Oppenheimer reported.

The population of the Washington metropolitan area which spills over into Maryland and Virginia has grown in both white and nonwhite components in recent years, and the relative proportions have remained relatively unchanged. However, in the District of Columbia, itself, the population pattern has altered.

The white population, which in 1950 represented 64 percent of the total, now amounts to only 47 percent of the city's total. In the same period, the nonwhite population has increased from 36 percent of the total population to 53 percent.

An important factor in this change is income. Of the nonwhite residents, 66.3 percent had incomes under $5,000 a year, compared with 30.8 percent of the white residents. Of the nonwhite citizens, 31 percent had incomes under $3,000 a year, compared with 11.6 of the white.

Estimates in 1957 showed 53 percent of the nonwhite and 17 percent of the white citizens unable to pay for hospital care. Even more significant of the economic status of the present childbearing population in the District, Oppenheimer pointed out, are the relative proportions of births under private medical care and hospital staff cases. Approximately 60 percent of all births to resident mothers, white and Negro, are staff cases. For the white births, between 18 and 20 percent were staff cases; for the nonwhite, more than 75 percent.

This lack of funds to pay for private physician care or hospitalization is reflected in lack of prenatal care, which in turn contributes to increases in premature births and neonatal mortality. In 1958, with 12.5 percent of the District of Columbia births premature, the percentage for those with prenatal care was 10.4 percent; for those without prenatal care, 22.7 percent. Neonatal mortality among the nonwhite portion of the population is high and increasing, Oppenheimer said.

Program action has not kept pace with the need for public services brought about by this change, Oppenheimer reported. Although the situation is now well recognized and steps are being taken to remedy it, she said, "the loss which has occurred is irretrievable."

Social Distress Invites Premies

Stress occasioned by depressed socioeconomic conditions surrounding the mother may contribute to premature delivery and stillbirth, according to findings reported by Helen Wortis, instructor in psychiatry, and Dr. Alfred M. Freedman, associate professor of psychiatry, State University of New York, downstate medical center.

Wortis and Freedman drew their information from the histories of mothers of 267 premature infants (2,100 grams or less) cared for in the premature nursery at the Kings County Hospital in 10 months of 1956–57. The area served by the hospital is highly congested and is known to have a high incidence of premature births. Its population includes a large proportion of Negroes and Puerto Ricans. Of the mothers studied, 80 percent were Negro, 11 percent Puerto Rican (both white and colored but mainly white), and 9 percent white. The hospital serves only the medically indigent.

As anticipated, the mothers studied came from families of low income, 71 percent under $4,000 a year, 18 percent under $2,000. Twenty-three percent of the mothers had received no prenatal care; an additional 34 percent had not started such care until the third trimester of pregnancy. Although 61 percent lived in their own apartments, many

had to share kitchen or bath facilities. Thirty-five percent lived in homes where the number of persons per room was more than 1.5; 3 percent had a crowding index of 3.51–4.50.

The predominant symptom of social disorganization in this premie population was the breakdown of the family, Wortis and Freedman said. Thirty-one percent of the group studied were unmarried. Of those who were married, many were separated from their husbands. Family breakdown, moreover, was a continuing pattern, not beginning or ending with this generation. Many of the mothers had themselves spent their childhood in broken homes, and 10 of the premature infants (1 in 24 of those surviving the nursery) were refused by their mothers and discharged from the hospital to a public agency.

"It is difficult to adequately describe the quality of life histories which we elicited," Wortis and Freedman said, "For most of these women the birth of a premature child was only one traumatic event in a life experience which contained many. Their histories were so different from what we think of as an average experience in our culture that the nearest equivalents we could think of were the vagrant characters flitting through Gorky's Lower Depths or Caldwell's Tobacco Road."

Term Controls

A control group, drawn from the same area and hospital, was made up of women who delivered at term during the same period and included representatives of the three ethnic groups considered. They could be presumed to come from the same social class as mothers of the prematures, Wortis and Freedman stated. Although the sample was small, no important differences were noted in place of birth, education, source of income, work status at conception, or length of time in New York.

In interviews with them, Wortis and Freedman gained the general clinical impression that these women were less tense and upset. Two important statistical differences were noted. The mothers of term infants were older (only 10 percent under 20 years of age compared with 26.5 percent under 20 among the premie mothers), and the term mothers were more likely to have had prenatal care and to have started it earlier. Twenty-three percent of the premie mothers had had no prior medical care, while only 4 percent of the term mothers had none.

Conclusions

Among the variety of causes found for premature delivery, maternal environment and social status have an important bearing, Wortis and Freedman said. "Poverty means early pregnancy, poor medical care, and broken families. In terms of individual experiences, it means an accumulation of stressful situations which must be alleviated by broad programs of social care aimed at elevating living standards and eliminating the social situations which we have observed. Better nutrition and housing, adequate financial resources, equal opportunities for education, and maintenance of family life and structure are essentials for attacking problems of premature delivery as associated with low socioeconomic status."

Pregnancy Losses Lower In Health Insurance Plan

Prematurity and perinatal mortality rates were significantly lower among members of a prepaid group practice comprehensive medical care plan than among the total New York City population delivered by private physicians.

Sam Shapiro and Dr. Paul M. Denson of the Health Insurance Plan of Greater New York and Dr. Harold Jacobziner and Louis Weiner of the New York City Health Department reexamined a finding reported 2 years ago (pregnancy loss in HIP was lower than that in the general population of New York City) by limiting their sample to patients delivered by private physicians. They also investigated the possibility that socioeconomic differentials and the greater availability of diplomates in obstetrics and gynecology in HIP account for the more favorable experiences in the medical care plan.

Comparison for 3 years (1955–57) showed that prematurity rates per 100 live births (adjusted for differences in age of mother and ethnic composition of the groups) are 5.7 for HIP and 6.2 for patients of private physicians. Adjusted perinatal mortality rates per 1,000 single live births and fetal deaths (20 weeks or more of gestation) were 23.1 for HIP and 27.9 for patients of private physicians.

According to the authors, data for 1955 showed that HIP did not have a more favorable distribution of occupations (of father) than the patients of private physicians and that, within virtually all broad occupation classes, HIP had lower prematurity and perinatal mortality rates.

The authors regarded as suggestive, but not conclusive, these two findings: to the extent that occupation of father reflects socioeconomic status, HIP's lower rates are not a consequence of this factor; perinatal mortality rates for diplomates in obstetrics and gynecology were lower than for other private physicians in the city but higher than for HIP. However, there is a possibility that diplomates in the city get more poor-risk cases than other private physicians. If so, this would affect the comparison with HIP.

Aside from the comparisons between HIP members and the patients of private physicians, the authors listed these significant findings for the entire city. Even in the highest occupation classes, only a small proportion of nonwhite and Puerto Rican women used private physicians. The stage of pregnancy when prenatal care began was affected by socioeconomic status, where the mother gets care, and ethnic group. In both white and nonwhite groups, there were major differences in pre-

maturity and perinatal mortality rates between general service (ward) cases and cases of private physicians.

The authors suggest taking a fresh look at differentials in pregnancy loss among other subgroups in New York City. They propose investigations to clarify cultural traits and attitudes of population subgroups and the influence of these attitudes on health practices prior to and during pregnancy. Also, much more needs to be known about the management of obstetrical care among patients of private physicians and about the general service cases, they said.

Mental Retardation Needs Diagnosed

Diagnostic data on 431 "mentally retarded" children, studied at three pilot State diagnostic and parent counseling clinics and three cooperating clinics for 8 months of 1959, were presented by Bernard Ferber, associate biostatistician, and Dr. I. Jay Brightman, executive director, New York State Interdepartmental Health Resources Board.

The board was established to supply a multidiscipline approach to all health problems. Teamwork by professional disciplines is a mandate, the authors indicated, in determining needs and giving indicated services to a mentally limited child.

Tabulation of information on the 431 children revealed:

- Of the children seen, 57 percent were under 6 years of age.
- Twice as many boys were referred as girls.
- Referral sources were 32 percent, hospital or clinic; 23 percent, private physician; 15 percent, family, relative, or friend.
- No previous specialized service had been given 38 percent of the children, and relatively few had received an adequate diagnostic study.
- Ninety-three percent were accepted and completed the diagnostic workup.
- Mental retardation was diagnosed in 74 percent of the children, 13 percent were questionable, and 14 percent were classified as not mentally retarded.
- Approximately 85 percent of the services recommended were considered available, 15 percent were not.
- Of the children studied, 212 were of school age; 58 percent of these were attending school, 42 percent were not.
- Prognosis, based on ability to function ultimately as an adult, was nil or poor for 24 percent, guarded for 52 percent, and good for 25 percent.
- Most frequent services recommended were schooling and training, and speech and hearing evaluation, including therapy and casework, and counseling.

Dental Care . . .

Diet Studies Explain How To Save Teeth

Two studies of diet, reported respectively by Dr. Robert L. Weiss, Public Health Service, and Margaret A. Dunham, director of nutrition, Indiana State Board of Health, both found a high association between carbohydrates and tooth decay, but with different emphases.

The study reported by Dunham found that the decay rate increased in relation to the rise in the level of carbohydrates in the diet. The Weiss study found that frequent eating of snacks between meals, preponderantly chewing gum, candy, soft drinks, pastries, and ice cream, is associated with a high def (decayed, indicated for extraction, or filled) index.

Weiss noted that modern research in dental health is guided by two hypotheses as to the relation between carbohydrates and caries. One is that the frequency of eating carbohydrates, especially foods containing sugar, influences the development of caries. Second, the consistency or chewiness of the food is an important factor.

The study under discussion examined 783 children in western Tennessee, 5 to 7 years old. Parents were asked which items of food, on a prepared list, had been eaten by the children on the previous day, and how often they had been eaten.

Specifically, Weiss found that there was a direct and consistent relationship between the frequency of eating between meals and caries experience. As the frequency of eating between meals increased, a corresponding increase was noted in the number of def teeth per child.

Utilization of findings of this kind in dental health educational programs, Weiss said, will enhance the effectiveness of these programs. Knowledge relating to between-meal eating can be easily understood by the public and can be easily applied throughout the course of everyday living.

The Indiana study, which surveyed 222 boys and girls aged 11 to 14 in 1947, was based on a 7-day food-habit study. It also asked about the frequency of eating carbohydrate foods, as well as the total milk intake daily.

This survey found the average daily intake of carbohydrates was 34.15 teaspoons per day. The frequency was 4.9 times per day, including meals, or 1.9 between meals. The average DMF (decayed, missing, filled) rate was 3.9. Half of the students had some degree of inflammation of the gums. Average milk intake was 2.67 glasses per day.

In connection with the Indiana

study, educational efforts were aimed at recommending a good diet, with a restriction on carbohydrates, and correct cleaning of the teeth after eating.

The dental health education program in Indiana, as described by Dunham, includes a cooperative activity conducted by the State Board of Health, the Purdue University Agricultural Extension Service, and the State Dental Association.

She also described State activities for developing nutritional aspects of dental health education among professional personnel.

Inservice training programs for teachers, usually consisting of an hour's meeting at a central school in the community, begin with a platter of snacks, designed to demonstrate the attractions of food low in refined carbohydrates. Platters include apple quarters, orange sections, pineapple slices, cauliflower bits, celery stuffed with cheese and peanut butter, carrot sticks, green pepper rings, sliced raw turnips, and nuts. Teachers are also offered milk, unsweetened fruit punch, and coffee.

Food surveys are recommended to the teachers, as a means of combining research and education.

Teachers are advised to speak in the primary grades of groups of foods, rather than of specific nutrients, and to emphasize the value of citrus fruits, green leafy and yellow vegetables, and milk. Rather than advocate special courses in nutrition, it is recommended that the subject be introduced naturally in connection with the established curriculum.

Two pamphlets used widely in the program include "Nutrition and Dental Health," published by the American Dental Association, and "Smackin' Good Snacks," published by the Indiana Board of Health.

Dental Care Approaches Needs of Aged and Ill

Several papers on the subject of dental public health explored the needs of the aged, chronically ill, and the handicapped, with respect to patterns of care, techniques, facilities, and personnel.

Dovetailed Services Urged

A plea for coordinating all dental care activities within the community for the disabled and chronically ill was offered by Dr. Marvin P. Sheldon, dental consultant of the Chronic Disease Program, Public Health Service. No single community has done this, to his knowledge.

Sheldon enumerated major conditions disabling about 5½ million noninstitutionalized persons in the country. Among typical community dental resources for them, he considers the dental society pivotal.

Hospital dental departments need expansion, he said. General hospitals give a sixth of their beds to long-term patients, but only 28 percent of all hospitals have dental services, sometimes only for exodontia or emergencies. Neither does the resident of the average nursing home of 20 beds have the dental service he badly needs.

Organized home care programs, now only 53, use dental clinics, sometimes in a hospital during special hours, or go to the patient with portable equipment. One city health department lends such equipment on appointment to members of a cooperating dental society. A portable unit including motor and arm, storage space and drawers, and working on ordinary house current is undergoing field trial, Sheldon reported.

Community dental activities should work as part of existing evaluation and diagnostic clinics, he said. These clinics give disability profiles and prognosis for medical rehabilitation and thus give a firmer base than dental treatability evaluation alone. Sources of financial aid for homebound patient projects include, according to Sheldon, existing Federal aid agreements, private philanthropy, State health and welfare funds, and nonprofit insurance companies.

The Kansas City Project

Community and professional leaders, conditioned to the importance of dental health for children, must be oriented to the value and importance of dental health to the aged and chronically ill, asserted Lewis W. Andrews, director of the Kansas City Dental Research Project, Public Health Service.

The project, established in 1957, is carried out in cooperation with Community Studies, Inc., and the University of Kansas City School of Dentistry. Health education media have assisted in acquainting the community with the purposes of the project, that is, to determine the nature and extent of dental service needs of the aged and chronically ill and problems involved in the treatment.

As a part of the project, a training program for senior dental and dental hygiene students has been established.

Personal contact with administrators of the original sample of 44 nursing homes (of a known 84) was responsible, in Andrews' opinion, for the good response. Prior recording by dental assistants of patients' medical and vital data saved time.

Three out of ten refused treatment: "My teeth will hold out as long as I will." "I don't want to be bothered." "You tend to your business and I'll take care of mine." Appointment cards for the 78 percent transported to the clinic resulted in few broken appointments. About 15 percent had home treatment and 7 percent came by ambulance. When dental care is completed, reexamination follows in 6 months. Also, new nursing home residents are added continually.

Out of a roster of 3,000 homebound chronically ill, compiled from records of voluntary health agencies, hospitals, welfare agencies, and religious organizations, 60 percent of the 964 selected were available for examination. Preplanning and organization, as in the nursing home phase, brought few refusals. About 9 percent were treated at home, 5 percent came by ambulance, and a few by their own means.

A total of 2,210 patients with an average age of 70 have received

dental examinations. Six out of ten patients examined needed and could be expected to benefit from treatment.

Cost and lack of transportation appear to be the major blocks to utilization of dental services. The dental profession is interested and willing to cooperate in dental programs for these patients.

Whether or not dentures are essential for maintaining nutrition of the edentulous chronically ill or aged patient was among criteria for measuring dental treatability of such patients outlined by Dr. Stanley Lotzkar, clinical director of the Kansas City dental project.

Other considerations are:

- The extent and duration of previous periodontal disease.
- Duration of edentulousness, patient's adaptation to it, and his probable tolerance for dentures.
- The presence of systemic disorders affecting healing, such as syphilis, diabetes, or arthritis.
- If partially edentulous, whether or not partial dentures will mean eventual loss of abutment teeth.
- Esthetic contribution to the patient's morale.

Lack of teeth sometimes seems to hasten aging, Lotzkar remarked. A patient's positive attitude can overcome numerous hurdles; but when negative, ideal conditions may not help. In treating those maladjusted to their physical disability, he advised patience, sympathy, and morale-lifting attention.

Lotzkar believes in keeping many serviceable teeth, if they are without pathology, even though the teeth may be mobile. The goal should be comfort, cleanliness, and the patient's well-being. Because of the effects of drugs such as anticoagulants, corticosteroids, and insulin, he urged consultation with physicians before surgical procedures for the chronically ill.

Since neglect of oral hygiene is widespread, dental hygienists are vital auxiliaries to dental care, including frequent prophylaxis, dental health education, and screening.

Outlining essential features for equipment used in home dental care, Lotzkar included use of lightweight metals, better operating lights and positioning devices, a combined aspirator and air compressor, and separate units for surgical, prosthetic, operative, or periodontal treatment, in a single manageable case.

The Philadelphia Handicapped

Workshops for nurses, physicians, and parents stressing the need for dental care of the handicapped in Philadelphia were cited by Dr. Manuel M. Album, lecturer in the University of Pennsylvania School of Dentistry, as a technique to combat the ignorance and apathy he feels is slowing the spread of such care.

Dentists were portrayed as both community initiators of such activities and educators of hospital, parent, or other groups interested in the handicapped. He believes that parent groups, welcoming dental projects as a step toward total care, will help finance dental clinics.

Album made the point that when dental treatment of a handicapped patient is required under a general anesthetic, it be given only in the hospital and that hospital officials and attending dentist should know each other's plans and requirements. Definite hospital time must be allocated and respected, he said, adding that the dentist should know operating room techniques and procedures. All such costs in Philadelphia are covered on a semiprivate basis by a hospitalization plan, he reported, and for the indigent handicapped, by the Pennsylvania Department of Health, in hospitals it certifies. The department also underwrote tuition in courses on dentistry for the handicapped given in the University of Pennsylvania School of Dentistry.

Epidemiology . . .

Poison Study Indicts Careless Storage

The nature of accidents involving poisons or potential poisons among children under 5 years, tends to vary with age, it appears from an analysis prepared by Dr. Howard M. Cann, Albert P. Iskrant, and Dorothy S. Neyman, all with the Accident Prevention Program of the Public Health Service. But a high proportion of the incidents occurred with poisons outside their usual containers or places of storage.

Using information obtained since 1957 from the National Clearinghouse for Poison Control Centers, the authors reviewed more than 15,000 reports, of which 14,069 were classified as poisoning accidents. Of these, 90 percent concerned children under 5. About 60 percent of the 14,000 accidents concerned children between the ages of 1 and 3. The highest incidence of poisonings was at age 18 to 24 months.

The younger the child, the more frequently the poison was obtained outside of its original container: for those under 1 year, about half of the poisons came from the original box or bottle. About a fourth of the 4-year-olds found the poisons outside their pristine packages.

The kitchen was the most frequent site of the incidents, accounting for 40 percent. More often than not, the chemicals were outside the customary storage place, and outside the primary package in one-fourth of the kitchen incidents. The bedroom was the next most common site.

Poisons were found most frequently on top of tables or chests, next most frequently in cabinets.

In 84 percent of the incidents, the children were presumably under parental supervision. In only 7 percent of the incidents was the child

supervised by another child, or unsupervised.

The 2-year-olds represented 39 percent of poisoning by external medications, and 46 percent of accidental poisoning by internal medication. The next highest frequency of poisoning by medication occurred among 3-year-olds.

Chemicals classed as cleaning and polishing agents, pesticides, petroleum distillates, and paints and solvents are particularly hazardous to 1-year-olds, who represent roughly half of the cases of poisoning by these commodities. The 2-year-olds swallowed these poisons more frequently than the 3-year-olds.

While children in their third year, and older, are less inclined than their juniors to swallow poisons, they show a greater preference for medications. More than half of the poison incidents in this age bracket resulted from self-administered internal medications, although they represent only a moderate share of the total cases of poisoning by medications.

On the other hand, children under 1 year represent the highest proportion of poisoning by external medications. They also claim the highest proportion of poisonings by pesticides.

Males are poison victims more frequently than females up to the age of 10 years. After the age of 15, females are the more frequent victims.

Aspirin, predominantly the so-called "baby-type," was the drug of choice in half of the incidents of poisoning by internal medication. It accounted for about 20 percent of all reported cases. No other chemical was reported to have such singular prominence.

The case fatality rate was 2.1 percent per 1,000 ingestions. For petroleum products it was 10, and pesticides 3.4.

Habitual Drinkers Highway Hazard

Addiction to alcohol as a highway hazard was one of the factors which led Pennsylvania's Department of Health in 1958 to set up a section on traffic epidemiology in its division of behavioral problems, according to Dr. C. L. Wilbar, Jr., State secretary of health. The medical chief of the section has undertaken to develop public health factors in the establishment of physical and mental standards for licensing of drivers. In this connection, he is acquiring data on the influence of alcohol on driving ability and studying records of accident repeaters.

Although alcohol in the bloodstream of a driver, passenger, or pedestrian has been incriminated as a major factor in highway injuries and deaths, Dr. Wilbar remarked that punitive and educational activities seem not to have been effective in discouraging the mobile drinker.

The literature available on the subject, slender though it is, he said, indicates that the habitual alcoholic rather than the casual drinker is the major offender. In confirmation of this conclusion, he said, of 241 patients treated for alcoholism in a State mental hospital in Pennsylvania, 12 within 4 years before admission were convicted of driving under the influence of alcohol. As a percentage, these alcoholics had 17 times as many such convictions as the general population of drivers.

Restriction of licensing, rather than revocation, he said, is the recommended policy for regulation.

In preparing drivers' licensing standards for the State department of revenue, the health department has enlisted support of subcommittees of the State medical society, dealing with general medicine, cardiovascular diseases, neurologic disorders, visual standards, auditory standards, orthopedic standards, mental health, and drugs and chemicals. These categories were employed originally in a New York University symposium on accident prevention in December 1956.

Other sources of reference used included the American Medical Association guide on determining fitness to drive a motor vehicle, and testimony before the Subcommittee on Traffic Safety, Committee on Interstate and Foreign Commerce of the House of Representatives of the 84th Congress, 1956. Except for certain psychological recommendations still under development, and certain standards for vision, the recommendations of the medical society have been approved in principle. Different standards apply to passenger transport operators, commercial operators, and private automobile drivers. Physical examinations for drivers are recommended on application and thereafter at the ages of 30, 40, 50, 60, and every 5 years thereafter.

Skin Radiation Reappraised

Fifty board-certified dermatologists collaborated in a survey organized by Dr. David Goe Welton, Charlotte, N.C., and Prof. Bernard Greenberg, School of Public Health, University of North Carolina, in a 1958 study of the use of ionizing radiation for treatment of skin conditions.

With records of 27,000 visits by patients, it was learned that ionizing radiation was used to treat almost a fourth of the conditions diagnosed. The 12 diagnoses most often treated by radiation were keloid, anogenital pruritis, neurodermatitis anogenital, other localized neurodermatitis, eczematoid dermatitis, dyshidrosis, epithelioma, chronic dermatitis venenata, fungus infections, psoriasis, all types of acne, and herpes zoster. Radiation uses increase gradually with the age of the patient.

A rather consistent uniformity of opinion was found as to the specific diagnoses for which radiation therapy should be used. The number of these conditions is considerably less than it was 10 years ago.

It was concluded that the selective use of radiation and the application of devices for increased protection of the patient support the belief that "there is no threat to the public health" from the use of ionizing radiation by dermatologists.

Toxoplasmosis Prefers Man to Mouse

The sea around us, according to Don Eyles, Public Health Service scientist, may be toxoplasmosis, perhaps the most frequent parasitic infection of this world.

Although widespread in man and many other warm-blooded animals, only in the last generation has human toxoplasmosis been recognized. Most adults carry antibodies which probably indicate prior experience with the infection. Eyles said there is little reason to doubt the specificity of the dye test which supports this estimate of prevalence.

Nevertheless, the mode or modes of transmission of the parasite, a protozoan of uncertain affinities which grows intracellularly in a variety of tissues, is unknown. Infections are usually benign, he said, but are occasionally severe and even fatal.

The only epidemiological characteristics of the disease suggested by Eyles apply to temperature, moisture, and family. No clear-cut economic, social, or environmental factor has been established, however.

Eyles suspects that studies of animals may provide the best clues to the disease. For example, he mentioned cats as having a high prevalence, whereas laboratory mice, which are quite susceptible to the parasite, rarely have spontaneous infections.

Seasonings and Flavorings Safe for Use

Safety clearance of most of the natural seasonings and flavorings that the housewife uses in her kitchen and of many others that go into her packaged foods was provided in a food additives regulation issued by the Food and Drug Administration in January 1960. More than 150 naturally derived seasonings and flavorings are listed as safe for use in food on the basis of the findings of qualified experts throughout the country.

Cinnamon, cloves, nutmeg, thyme, and vanilla, are included as well as those familiar to the gourmet or the commercial food processor such as coriander, mace, savory, and extracts of balsam of Peru, spike lavender, wild cherry bark, and ylang-ylang.

The list was developed from the comments of food scientists on an original list of natural flavors published in the April 21, 1959, Federal Register. Manufacturers who use these flavors need not furnish further proof of their safety.

Information on safe usages for seven flavoring substances is not sufficiently well established among qualified experts to permit a formal determination by the Food and Drug Administration that they are "generally recognized as safe." These are quinine, red and yellow cinchona barks from which quinine is derived (all three are used in so-called "tonic" carbonated water), two forms of orris root (having minor food use as a supplemental flavor), and wintergreen and methyl salicylate (chemically identical forms of the same flavor).

Wintergreen and methyl salicylate have been used in confectionery for many years and there is no evidence that the very small amount required to flavor candy is hazardous. However, the agency has deferred a determination on their safe use until additional data from current laboratory studies of methyl salicylate are available, possibly in a year. Meanwhile, action will not be taken against candy or other foods flavored with methyl salicylate or oil of wintergreen in the amounts customarily used for these substances.

Concerning quinine, cinchona, and orris as flavorings, it is expected that levels of safe usage will be established by regulations issued in response to petitions from interested users.

Signs and Symptoms

of trends in public health

Alcoholics employed in the transportation industry as locomotive engineers, as pilots, or as truck or bus drivers are a public hazard, says Dr. Marvin A. Block, in an editorial in the *Journal of the American Medical Association*, August 29, 1959. He recommends cooperative efforts by labor, management, and medical societies to exclude heavy drinkers from these and other positions where inaccurate or faulty judgment due to alcohol endangers the lives of passengers.

» «

Only 42 days of eye irritation due to smog in the first 8 months of 1959 were reported from Los Angeles County compared with 51 days in the comparative period of 1958, and 61 days in 1957, although the weather in 1959 was more conducive to smog than in the past. County supervisor Warren M. Dorn feels that current control measures account for the improvement. However, air pollution experts agree that significant gains cannot be achieved until control of automobile exhaust fumes is possible.

» «

"You're on your own if a national emergency occurs" warned Dr. Carruth J. Wagner, acting as spokesman at a recent joint meeting of the Disaster Medical Care Committee of the American Medical Association and the Division of Health Mobilization of the Public Health Service.

Survival after a thermonuclear attack would depend upon the individual's ability to take care of himself for a period anywhere from 18 hours to 2 weeks, Dr. Wagner said. "Everyone should know how to perform lifesaving measures to stop bleeding, give artificial respiration, and treat shock," he continued, adding that people must also know how to assure themselves and their families of safe water and food supplies, general nursing care, and personal shelter and sanitation facilities.

The AMA committee requested the meeting as part of a series of briefing sessions being scheduled throughout the United States. Dr. Wagner is chief of the Division of Health Mobilization, Public Health Service, which was established May 1, 1959, for the purpose of investigating the health and medical needs of the Nation in time of emergency and directing a program to meet these needs. He explained that his statements were premised on the capabilities of modern weapons to cause millions of casualties and to completely disrupt all materials and facilities involved in day-to-day living.

» «

In December 1959, California courts ordered a chemical company to pay the State $13,369 as a penalty for killing game fish by water pollution. The suit was the first brought by the Department of Fish and Game.

» «

Career opportunities in health were brought to the attention of high school and college students, guidance advisers, and parents last November in Pennsylvania.

The project was co-sponsored by the Pennsylvania Department of Health, Pennsylvania Medical Society and its auxiliary, the Pennsylvania Public Health Association, the Pennsylvania Health Council, and other State and local health agencies.

Governor David L. Lawrence signed a proclamation. News articles, television spots, and radio announcements were distributed to all newspapers, and television and radio stations. Community activities included panel discussions at school assembly programs, community meetings, and parent-teacher association meetings; distribution of printed materials; announcements during school sports events; tours through hospitals, water supply systems, and health centers; reports in school newspapers; and the formation of health career clubs.

» «

In the Soviet Union, one-half of the engineering students and one-third of the scientists and engineers are women.

Only about 8 percent of all of the scientists and engineers in the United States are women and 85 percent of them are concentrated in the three fields of biology, chemistry, and psychology.

These figures were cited by Betty Lou Raskin, research associate with the Johns Hopkins University radiation laboratory, in urging more encouragement and acceptance by Americans of women in science.

» «

Professional nurses from every State and Puerto Rico received Federal aid during the past 3 years for advanced training for administrative, supervisory, and teaching positions, the Public Health Service has announced. A total of 3,803 have benefited.

Slightly more than half the trainees each year were preparing for teaching positions, both in schools of professional nursing and schools of practical nursing. About one-fourth were studying for positions in administration, and the remaining one-fourth for supervisory posts.

» «

Carbon monoxide from the stacks of a steel mill in Weirton, W. Va., last September hospitalized 13 persons a block away.

Poliomyelitis Immunization House to House

WILLIAM A. ALLEN, M.P.H., AND MICHAEL J. BURKE, M.A.

WHAT results can be obtained by a house-to-house poliomyelitis campaign among "hard-to-reach" groups?

This question had been raised a number of times by staff members of the Philadelphia Department of Public Health. When in the summer of 1959 it appeared that immunization was lagging in sections of the city where poliomyelitis incidence was highest, it was decided to conduct a house-to-house program through the use of four mobile teams.

A number of extensive immunization programs had been conducted in prior years in Philadelphia. As in many other communities throughout the country, the poliomyelitis immunization program was initiated in April 1955, as soon as the Salk vaccine was released.

The first phase was directed toward inoculating children in the first and second grades of public, parochial, and private schools. From the inception of this program, there was excellent cooperation between the Philadelphia Department of Public Health and the medical divisions of the public and parochial schools.

Every year since 1955, the schools have conducted intensive inoculation programs with vaccine furnished by the health department. Age restrictions were gradually modified so that, eventually, the immunizations were made available to children in all grades. The health department provided the personnel for the administration of the parochial school program. The public schools, however, supplied their own personnel for their program.

Mr. Allen is director of the division of health education and Mr. Burke, statistical epidemiologist, Philadelphia Department of Public Health.

All vaccine used by the schools in 1955, 1956, and 1957 was supplied by the health department either through its own budget or by allocation from Federal or State sources. In 1958 and 1959, however, in addition to the city supply, the Philadelphia Chapter of the National Foundation gave the department 100,000 cc. of vaccine, some of which was used by the schools. In the spring of 1959, the public schools purchased additional vaccine for their use.

In the summer of 1956, again with the cooperation of the schools, the health department organized 10 teams, 1 in each of the 10 health districts into which the city is divided. These teams moved from one school to another each day. They inoculated 110,000 children. The teams worked in 113 public and parochial schools immunizing children under 15 years of age and expectant mothers. By working through the schools to bring the program to the people in their neighborhoods, great numbers of previously unvaccinated persons were reached. At the same time, daily inoculations were given in the health centers.

In 1957 the health department, the Hospital Council, and the Philadelphia County Medical Society jointly conducted inoculation clinics in 10 private hospitals strategically located throughout the city. These clinics were held on 4 Saturdays selected so that an individual could receive at least two inoculations.

Members of the county medical society volunteered their services to staff the clinics. Volunteer clerical workers from the local chapter of the National Foundation and hospital and health department personnel completed the clinic staffs. During this phase of the program, which provided immunizations for persons 40

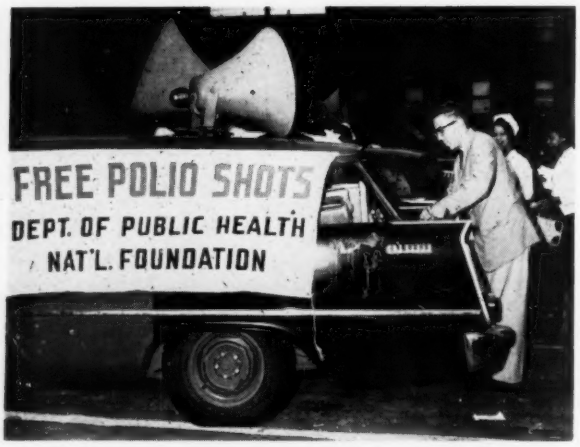
years of age and under, almost 75,000 persons were inoculated.

On the first Saturdays of February and March 1958, inoculations were offered at 10 public and parochial school sites to persons through 40 years of age. Vaccine, as well as a number of volunteer workers, was supplied by the local chapter of the National Foundation. Most of the staff, however, came from the health department. Because inclement weather limited the total number immunized to less than 40,000, the health department had a large amount of unused vaccine. The department made it available to universities, colleges, seminaries, professional schools, and technical and vocational schools.

In the summer of 1958, daily inoculation sessions were held in district health centers for all persons 40 years of age and under. Night sessions for persons in these age groups were conducted during August, September, and October.

In all of these programs the department noted that the response was poorest in areas of the city having the lowest economic standards and the most congested living conditions.

Since 1955, Salk vaccine has been distributed upon request to hospitals for their prenatal and pediatric clinics. In 1959, for example, vaccine was distributed to 36 hospitals and to private physicians for the inoculation of their patients who could not afford the cost of the vaccine. The hospitals and the physicians were required to submit a form for each inoculation administered.



Mobile teams traveled in loudspeaker-equipped station wagons, which also carried supplies

Despite all efforts to raise the immunization level of the city to a satisfactory level, 77 cases of poliomyelitis, including 2 deaths, occurred in 1958. This represented a sharp rise over the previous year and was the greatest number of cases recorded in the city since pre-Salk days. In 1954, there had been 228 cases. The number of cases in 1955 was 42, and in 1956 the number declined to 16. In 1957, only 10 cases were recorded in the city.

Of the 77 cases which occurred in 1958, 39 cases, or 50.7 percent, were in health districts 5 and 6, which had an attack rate of 9.1 per 100,000 population. In comparison, the remainder of the city had 38 cases, or 49.3 percent, an attack rate of 2.1 per 100,000. The overall attack rate for Philadelphia was 3.5 per 100,000 population.

Late in 1958, the department reviewed the effectiveness of the various immunization programs which had been undertaken. Based upon statistical data gathered from school programs, special programs, and district clinics, estimates were made regarding the general immunization status of the city. It became apparent that additional efforts were needed to motivate residents in health districts 5 and 6 to protect their children and themselves against poliomyelitis and to prevent the possible development of an epidemic in the city.

Districts 5 and 6 are bounded by the Delaware and Schuylkill Rivers and extend from Vine Street on the south to Lehigh Avenue on the north. They are characterized by substandard housing, low incomes, and a greater incidence of other diseases such as tuberculosis and venereal disease. These districts also have a higher infant mortality rate than the city as a whole and many other social and economic ills.

Because of the apparent failure to gain response in these districts to the previous inoculation campaigns and the upsurge of poliomyelitis incidence in 1958, most of which occurred in this area, the health department decided to direct its attention to methods aimed at the "hard-to-reach" groups.

Accordingly, early in 1959 special methods were used. Thousands of specially designed leaflets and posters were distributed, volunteers visited homes in the neighborhoods, and sound

A crowd forms around a team giving inoculations on a Philadelphia street corner

trucks toured the neighborhoods announcing the free inoculations in the clinics. All of these efforts were directed at getting residents to come to the established clinics.

Because of the wide variety in the backgrounds of residents of the city including economic, cultural, and ethnic differences, a number of different motivational approaches were used, especially among the "hard-to-reach" groups.

Within a few weeks it was evident that this program, aimed at providing free inoculations to children under 7 years of age and expectant mothers, was lagging despite the intensive efforts to encourage residents to participate.

With the poliomyelitis season approaching and realization that the "hard core area" had not been reached adequately, plans were made to bring the program to the people through the use of mobile teams operating on a door-to-door basis in districts 5 and 6.

Several planning meetings of representatives from public health nursing, epidemiology, health education, and other divisions were held to pave the way for the kickoff of the new program.

Four teams were organized to work in these districts. The teams traveled in station wagons which were equipped with vaccines, syringes, and other supplies. Banners announcing the free injections were prominently displayed on the vehicles, and loudspeakers were mounted on

At the district health center the teams laid final plans for the evening's operations

the roofs. Personnel for each team consisted of a physician to give the injections, a public health nurse to go from door to door to tell residents about the availability of the inoculations and to answer questions, a graduate nurse to fill syringes and assist the physicians, a health educator to organize in advance and coordinate a volunteer corps to assist in the home visits, a clerk to register persons requesting inoculations, and a disease control investigator or sanitarian to drive the station wagon and to make announcements over the loudspeaker.

The local chapter of the National Foundation supplied funds to rent sound equipment and produce the tape recordings which were used in addition to live announcements. A well-known soft drink company provided containers to refrigerate vaccine, and a sound equipment company provided additional loudspeakers.

The newly constructed health center in district 6 was selected as headquarters for the program. This center has an excellent physical plant with adequate storage facilities. It has a large parking lot which permits easy loading of vehicles, and in addition, it is convenient to good transportation facilities to all parts of the city, which facilitated the travel of persons staffing the program.

The house-to-house program was initiated July 6 and continued through September 11. Hours of operation were between 5:30 and 7:30 p.m., Mondays through Fridays. Because teams continued to work until everyone wishing an injection had been immunized, the teams frequently did not return to the headquarters until 9 p.m.

In order to speed the registration procedure, no forms were filled out for adults. For children under 21, it was requested that parents complete a parental consent form. When parents were unable to come to the mobile unit, children were given a parental consent form and were immunized when they returned the completed forms.

When the house-to-house program began, immunizations were offered only to children under 7 years of age and expectant mothers. Because of the difficulty of limiting the inoculations to this age group, the program was expanded to provide immunizations for persons of all ages.

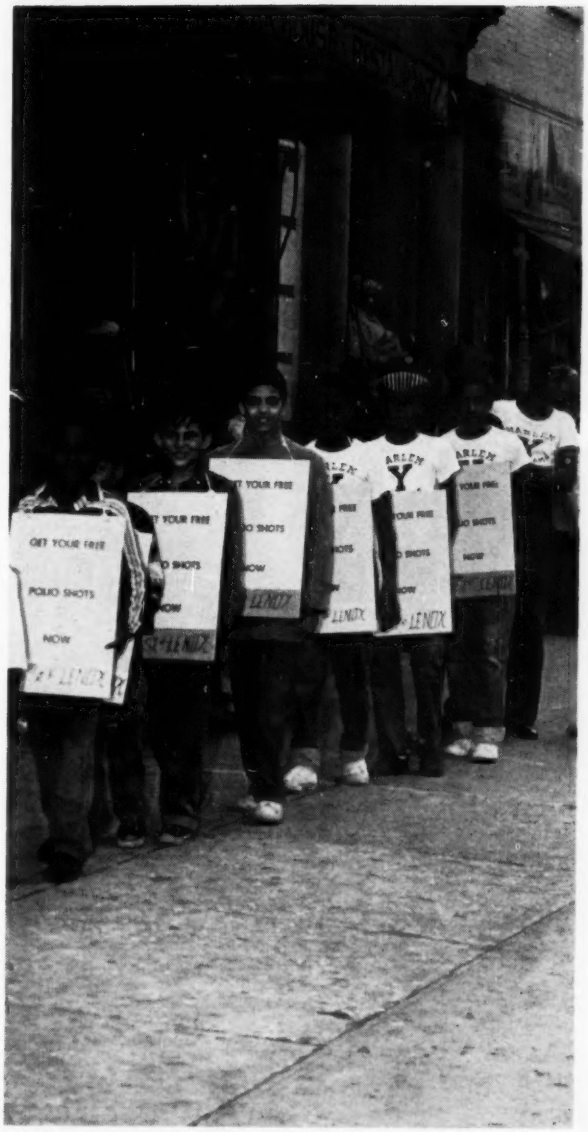
In the actual operation, a team sometimes proceeded along a particular street, stopping often to give injections. Frequently, however, it was more advantageous to park the vehicle for long periods and administer the vaccine from a strategically situated parking lot or street corner.

During the 10 weeks that the program was in operation, 37,879 individuals were inoculated. Of this number, 21,326, or 56.3 percent, received their first inoculation; 7,297, or 19.3 percent, their second; 5,348, or 14.1 percent, their third; and 3,908, or 10.3 percent, their fourth. By age distribution, 12,363, or 32.6 percent, were under 7 years of age; 6,777 or 17.9 percent were 7 through 14 years; 1,823 or 4.8 percent were 15 through 18 years; and 16,916 or 44.7 percent were 19 years of age or older.

Since more than 75 percent of the inoculations were given to preschoolers and to persons more than 19 years of age, the program was effective in reaching susceptible age groups as well as groups in which the immunization level was considered to be extremely low.

Although it is felt that the house-to-house approach was successful in immunizing many people who would not otherwise have been reached, several disappointments were encountered. During the campaign, eight cases of paralytic poliomyelitis and one nonparalytic case occurred in Philadelphia, all of them in health districts 5 and 6 where the mobile teams were operating. The fourth, fifth, sixth, seventh, and eighth cases occurred almost within the shadows of the mobile units. None of the persons with the disease had availed themselves of the vaccine.

The success of the campaign, however, is indicated by the fact that the incidence of polio-



. . . and in New York City

Two mobile clinics began giving free poliomyelitis inoculations in August 1959. The clinics, set up in trucks loaned by the city's civil defense office, operated from 1 to 6 p.m. for 10 weeks and moved to a new location each day. *Above:* At 125th Street and Lenox Avenue health department staff members register those to be vaccinated. *Right:* Harlem children wearing sandwich boards help to publicize the clinic's visit in their neighborhood.

myelitis in Philadelphia in 1959 was approximately 73 percent under the incidence for 1958. For the Nation as a whole the incidence of poliomyelitis was up almost 42 percent in 1959.

It seems evident that the house-to-house approach, by providing immunizations for "hard-to-reach" groups in their neighborhoods, played a prominent part in cutting the toll of poliomyelitis in Philadelphia.

Summary and Conclusions

Since 1955 when the Salk vaccine was released, the Philadelphia Department of Public Health has conducted a continuing poliomyelitis immunization program which has had a number of different phases. Cooperating in these various phases have been the public and parochial schools, the Philadelphia County Medical Society, the hospitals, and the local chapter of the National Foundation.

During the program, many of the well-established techniques to motivate residents to become inoculated were used. The department staff noted that, although response to various phases of the program was great in many higher income areas of the city, the response in certain of the lower income, highly congested areas was almost invariably poor.

Although the incidence of poliomyelitis was relatively low in 1955, 1956, and 1957, an upsurge of the disease occurred in 1958 when there were 77 cases, including 2 deaths. An analysis of the immunization situation made by the department staff late in 1958 led to the conclusion that a renewed effort was required to increase participation in the program among the residents in health districts 5 and 6, the area in which most of the 1958 victims lived.

A special program was instituted early in 1959 to encourage the groups most susceptible to poliomyelitis to become immunized at the regular health department clinics in districts 5 and 6.

When this program lagged in the spring of the year, the health department staff, realizing that adequate immunization had not been gained and faced with the threat of a possible epidemic or outbreak, organized a special house-to-house immunization campaign in which mobile teams toured the neighborhoods in health districts 5 and 6 for a 10-week period, July 6 through September 11.

During this effort, 37,879 persons were immunized. The results of the house-to-house campaign revealed that this type of direct approach, particularly to groups which do not respond to the usual approaches, can be of great value in increasing participation in immunization programs. Of the people responding to the campaign, the majority were in the age groups most susceptible to poliomyelitis and in which the immunization level was particularly low.

Detailed planning and close cooperation of all health department organizational units, as well as close cooperation with groups in the community, are essential in any program of this type.

Kurlander, Assistant Surgeon General

Arnold B. Kurlander, M.D., formerly deputy chief of the Bureau of Medical Services, Public Health Service, has been named Assistant Surgeon General. He will assist the Surgeon General on current program matters, facilitate communications between the four bureaus of the Service and the Surgeon General's office, and expedite the handling of program aspects of operating problems.

Transport of Streptococci on Filter Paper Strips

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PROBABLY the most prevalent bacterial pharyngitis of humans today is that caused by beta hemolytic streptococci of group A. The clinical diagnosis of such an upper respiratory infection, although reasonably good in some instances (*1*), depends on a clinical picture which is not characteristic in all age groups (*2, 3*). Adjunct laboratory aid, by isolation of the causative organism, is therefore valuable in determining and evaluating therapy and its duration and is a necessity for intelligent control and prophylaxis. The latter measures apply not only to the streptococcal infection, but even more importantly, to the nonsuppurative sequelae of rheumatic fever (*4*) and acute diffuse glomerulonephritis (*5*).

Procedures for isolating bacteria are not available to the average physician or to health officers in some areas. Even when these pro-

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cedures are available, methods of transporting pharyngeal materials to a laboratory are cumbersome and do not always assure the arrival of viable bacteria. To obviate some of these difficulties, a method for mail transport of throat swabbings on sterile filter paper in enclosed kits was recently developed (*6*). The method appears reliable for use in the diagnosis of group A streptococcal infection: beta hemolytic streptococci, 80 percent of which were of group A (*7, 8*), were recovered by culture after 2 to 10 days in transit on the filter paper strips (FPS). The results of testing more than 2,500 children compared favorably with those obtained from immediate culturing, by usual techniques, of simultaneous paired control swabs.

The present study was made to test further the FPS method for reliability, reproducibility, effects of transport distance, and other factors on the isolation of beta hemolytic streptococci from pharyngeal swabs.

Clinical Material

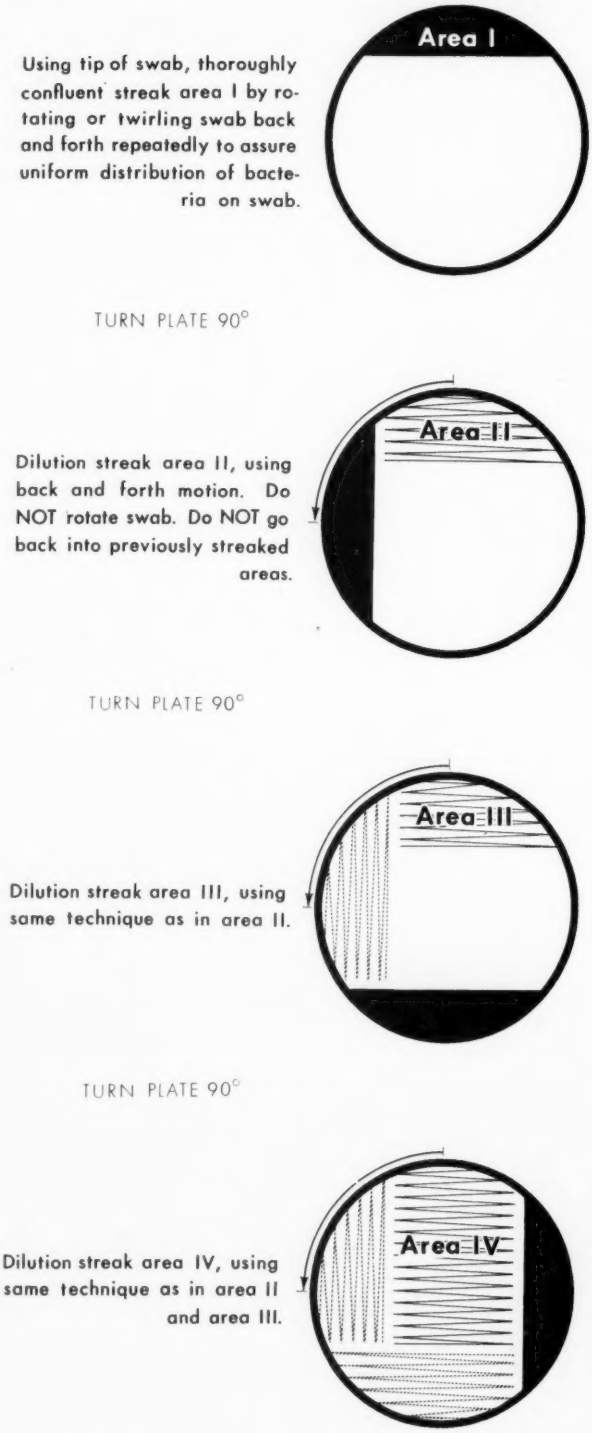
A total of 400 paired throat swabbings were supplied by three source laboratories, W, X, and Z, located in California. Laboratories W and X obtained 264 of the paired swabbings from patients in the closed population groups at a private pediatrics office, at the outpatient pediatrics clinics, and in a cooperating county health department (*7*).

The remaining paired swabbings were supplied from a field trial in which more than 500 paired throat cultures were obtained from children or their parents in less than 3 hours. This field trial was conducted at an open county clinic during a 1-day Salk vaccine inoculation program. The microbiologists on temporary assignment from laboratory Z found that the 500 paired cultures were not obtained by the method proposed and the filter paper strips were not air dried 3–5 minutes. Of these 500, the first 136 controls and the paired filter paper strips are reported for comparison with data obtained by the proposed method.

Methods

To obtain paired throat cultures, simultaneous swabbing was employed. Two throat swabs were held in one hand and thoroughly rotated over the pharynx of the patient, care being taken to obtain an entirely satisfactory specimen. Without delay, one swab was dilution streaked onto 10 percent defibrinated sheep

Figure 1. Method of streaking blood agar plate


Area I
Using tip of swab, thoroughly confluent streak area I by rotating or twirling swab back and forth repeatedly to assure uniform distribution of bacteria on swab.
TURN PLATE 90°
Area II
Dilution streak area II, using back and forth motion. Do NOT rotate swab. Do NOT go back into previously streaked areas.
TURN PLATE 90°
Area III
Dilution streak area III, using same technique as in area II.
TURN PLATE 90°
Area IV
Dilution streak area IV, using same technique as in area II and area III.

blood agar (fig. 1) which was incubated immediately at 37° C. and designated as the control culture by source laboratory W, X, or Z.

The other swab was streaked heavily back and forth onto a filter paper strip in an opened kit as described (*6, 7*). The strip was air dried 3–5 minutes before the kit was refolded, placed in a Manila envelope, and mailed or transported to a receiving laboratory, *p*, *q*, *r*, or *s*. Two of the source laboratories in California also acted as receivers. The other receiving laboratories were in Georgia and Maryland.

After 2–10 days the filter paper strip was removed from the kit and plated (fig. 2), except for strips which were plated after 5 to 21 days by receiver *s*. In plating, the FPS was removed from the kit and placed inoculum side down on the blood agar surface without prior treatment of any kind. Before the plate was inverted for incubation, the plated strip was inspected to see that it had absorbed moisture from the medium. Any part of the strip which was dry was pressed gently against the surface of the agar until it appeared wet. After 6 hours' incubation at 37° C., the filter paper strip was removed from the primary plate and placed inoculum side down on a second or replica plate. Both replica and primary plates then were incubated 18 hours at 37° C., making a total of 24 hours for the primary plate.

The visual reading was then made with the strips removed so that isolates could be picked. If the growth was heavy, only the primary plate had discrete beta hemolytic colonies, the replica plate having confluent lysis. Occasionally, if growth was very light the primary plate had no lysis, but this finding was exceedingly rare. Plating was on 10 percent defibrinated sheep blood agar in laboratories *p* and *r* and on 3–5 percent defibrinated rabbit blood agar in laboratories *q* and *s*. Three of the laboratories were relatively unfamiliar with the FPS technique.

Cultures from paired swabs were designated by number. In order to eliminate bias, the controls and filter paper strips were matched as pairs only after final reports were received. Each of the four receiving laboratories was sent 34 inoculated FPS kits by each of three source laboratories, 408 in all. Eight kits were reported lost, leaving 400 paired cultures in the study. Of each set of 34 kits, 17 were estimated to be negative and 17 positive on the basis of preliminary visual reading of the control cultures at the source laboratory.

From all positive cultures (control and filter paper strip) isolates were identified by serologic grouping (*9*). At two laboratories (*q* and *s*) grouping was done with antiserums from the Communicable Disease Center, Public Health Service, Chamblee, Ga. All other grouping was done by laboratory *r* with antiserums from a biological supply company (Difco).

Two statistical estimates on pooled data are presented, the difference between two proportions and twice the standard error of the difference between these proportions. The difference between the two proportions is considered significant only if it is more than twice the standard error (*10*).

Recovery by Streptococcal Group

Group A streptococci were isolated from control cultures and cultures of filter paper strips.

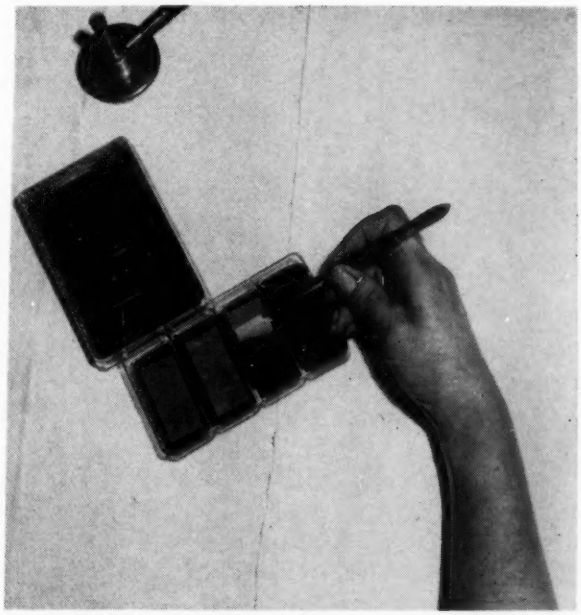


Figure 2. Plating a filter paper strip

The filter paper strip is placed, inoculum side down, on the surface of the blood agar medium. The strip absorbs moisture from the medium and is plated directly upon removal from the kit without treatment of any kind.

The percentage recovery was the same, although controls were plated at once from throat swabbings, while inoculated FPS were in transit or were held 2–17 days prior to culturing. Of the 206 group A strains recovered, 106, or 52 percent, were from controls, and 100, or 48 percent, were from filter paper strips (table 1). Basing the percentage estimate for group A on the 400 cultures reported by receiving laboratories, recovery was 25 percent from FPS and 26.5 percent from controls. These percentages are not different; on pooled data the difference between proportions equaled 0.015, and twice the standard error equaled 0.062.

The transit and holding period prior to culture of the 100 filter paper strips from which group A streptococci were isolated was 2–17 days (table 2). Within the designated parameters (2–10 days holding time) of the study, 87 group A streptococci were isolated from FPS and 88 from control cultures plated immediately, a striking record. Due to the small numbers plated each day and to the finding that one set of 34 filter paper strips had no growth on culture after a transit and holding period of 15 days, statistical estimates are not considered valid for percentage recovery based on a single day or on time periods beyond the anticipated 2–10 days before plating (table 2).

The percentages in table 3 show that group A streptococci survived equally as well when the FPS were shipped 2,500 or 3,000 miles into Maryland or Georgia as when shipped 400

Table 1. Number of positive cultures, controls and paired filter paper strips, by streptococcal group

Streptococcal group and receiver	Source W		Source X		Source Z		Total controls	Total FPS	Total
	Controls	FPS	Controls	FPS	Controls	FPS			
Group A									
p	12	9	12	17	11	12	35	38	73
q	11	8	8	8	0	3	19	19	38
r	14	12	5	7	8	2	27	21	48
s	10	11	12	11	3	0	25	22	47
Total	47	40	37	43	22	17	106	100	206
Percent							52	48	100
Group B									
p	1	1	0	1	3	0	4	2	6
q	2	3	1	0	0	0	3	3	6
r	0	0	0	0	0	0	0	0	0
s	0	0	0	0	1	0	1	0	1
Total	3	4	1	1	4	0	8	5	13
Percent							61	39	100
Group C									
p	3	2	1	1	7	1	11	4	15
q	3	1	1	2	0	0	4	3	7
r	1	0	4	1	7	3	12	4	16
s	2	0	0	0	6	0	8	0	8
Total	9	3	6	4	20	4	35	11	46
Percent							76	24	100
Group G									
p	1	0	1	1	4	4	6	5	11
q	1	1	0	0	0	0	1	1	2
r	2	3	4	2	2	2	8	7	15
s	5	2	2	1	2	0	9	3	12
Total	9	6	7	4	8	6	24	16	40
Percent							60	40	100
All groups	68	53	51	[1] 53	54	27	173	[1] 133	[1] 306

[1] Includes one nongroupable strain.

Table 2. Number of isolations of streptococci by group in relation to holding and transit time

Number of days FPS held	Group A isolations			Groups B, C, and G isolations		
	Controls positive	FPS positive		Controls positive	FPS positive	
		Number	Percent		Number	Percent
1	0	0	----	0	0	----
2	7	6	86	1	0	0
3	10	8	80	3	[1] 2	67
4	10	10	100	5	5	100
5	4	3	75	5	3	60
6	32	30	94	30	15	50
7	12	15	125	3	3	100
8	6	6	100	2	2	100
9	3	6	200	1	0	0
10	4	3	75	1	1	100
Total 2–10 days	88	87	99	51	30	59
11	5	4	80	2	0	0
12	4	4	100	2	1	50
13	1	1	100	0	0	----
14	2	2	100	0	0	----
15	4	[2] 1	25	9	[2] 0	0
16	1	1	100	0	0	----
17	1	0	0	3	1	33
Total 2–17 days	106	100	94	67	[1] 33	49

[1] Includes one nongroupable strain.
[2] No growth for one set of 34 kits, paired with controls having 3 group A and 9 B, C, or G isolates.

miles or less from the source laboratories in California. Agreement for group A isolates was 86–100 percent among all receivers (*p*, *q*, *r*, *s*) and all sources (W, X, Z), percentage estimates being based on the total negative controls. For negative controls, percentage figures below 100 percent indicate that group A streptococci were isolated from the matched filter paper strip cultures. For positive group A controls, laboratories receiving FPS from sources W and X were in approximate agreement, with a record of 74–86 percent recovery (table 3). This 74 to 86 percent range in percentage recovery is no greater than would be anticipated from prior investigations of throat flora (*11,12*). In the investigations cited, variability was so great that it was deemed impossible quantitatively to interpret the growth on throat cultures.

In contrast to the agreement with sources W and X, the percentage agreement for positive group A controls varied from 0 to 91 percent among laboratories receiving FPS from source Z. These filter paper strips were not obtained under the conditions described for the study nor were they air dried. The set of 34 kits sent receiver *q* had no paired positive controls, the set sent receiver *p* was estimated to consist only of positives, and the 34 kits sent receiver *s* showed no growth when the FPS were plated at 15 days, or 5 days after the designated holding period of 2–10 days.

There was remarkably close agreement (100 isolations from filter paper strips, 106 isolations from controls) in the recovery of group A streptococci, regardless of holding time, source, location of receiver, and previous use of the technique (tables 1 and 2).

Groups B, C, and G beta hemolytic streptococci, on the other hand, apparently have been recovered in significantly greater percentages from the control than from FPS cultures (tables 1 and 2), but inspection of the data results in reservation of an opinion. Within group C, only about 25 percent and within group B or G only about 40 percent of the streptococci isolated were from filter paper strip cultures (table 1). However, a review of

the original records shows that 46 percent (31 of 67) of all the FPS paired with groups B, C, and G positive controls were from source Z and were not air dried. For this reason tabulation by holding time before plating does not yield additional useful information on these groups (table 2). Insufficient data were obtained in the study to support a valid conclusion on the efficiency of the filter paper strip technique for use in recovery of group B, C, or G streptococci. Additional study is warranted.

Recovery by Source and Receiver

Sources W, X, and Z. Of all paired cultures 57 percent, or 227, were negative controls and 43 percent, or 173, were positive controls (table 4). There were 306 positive isolates, of which 33 percent, or 133, were from cultures of filter paper strips. This is significantly less than the percentage of positive controls (difference between proportions on pooled data equaled 0.100 and twice the standard error equaled 0.067). Interpretation of this difference is complicated by conditions which obtained at source Z.

The pattern of agreement of reports on matched filter paper strip and control cultures for the entire study (table 5) is somewhat similar to the pattern of agreement of group A isolation (table 3). For the entire study there is 81–100 percent agreement for FPS reports matched with negative controls. The 81 percent indicates that 7 of the filter paper strips from which positive cultures were obtained were matched with negative controls (sources W and X, receiver *p*, table 5).

Sources W and X compared with Z. For positive controls the percentage agreement was equivalent for sources W and X regardless of receiver (74–81 percent), but this is not the case for source Z (0–64 percent, table 5). There is no difference between the percentage of positive isolates from air dried filter paper strips (40 percent) and from controls (45 percent, table 4, sources W and X). The difference between proportions on pooled data equaled 0.05 and twice the standard error equaled 0.086.

There is a difference in recovery if the inoculated FPS are not air dried. For instance, from source Z percentage recovery from strips is only half that from positive controls, 20 and 40 percent respectively (table 4).

Table 3. Isolation of group A beta hemolytic streptococci from filter paper strips and controls by source and receiver

Source and receiver	Negative controls [1]				Positive controls [2]			
	Negative FPS	Positive FPS	Total	Percent agreement	Positive FPS	Negative FPS	Total	Percent agreement
Sources W and X								
p	38	6	44	86	20	4	24	83
q	43	2	45	96	14	5	19	74
r	45	3	48	94	16	3	19	84
s	40	3	43	93	19	3	22	86
Total	166	14	180	92	69	15	84	82
Source Z								
p	21	2	23	91	10	1	11	91
q	31	3	34	91	0	0	0	----
r	26	0	26	100	2	6	8	25
s	[3] 31	0	31	[3] 100	[3] 0	3	3	[3] 0
Total	109	5	114	96	12	10	22	55
Total W, X, and Z	275	19	294	94	81	25	106	76

[1] Negative controls=no streptococci isolated or streptococci other than group A.
[2] Positive controls=group A streptococci isolated.
[3] No growth.

Table 4. Number of negative and positive cultures for beta hemolytic streptococci by source and receiver

Source and receiver	Total paired specimens [1]	Negative		Positive	
		Control	FPS	Control	FPS
Source W					
p	34	17	22	17	12
q	34	17	21	17	13
r	34	17	19	17	15
s	34	17	21	17	13
Source X					
p	34	20	14	14	20
q	30	20	19	10	[2] 11
r	33	20	23	13	10
s	31	17	19	14	12
Total	264	145	158	119	[2] 106
Percent	100	55	60	45	[2] 40
Source Z					
p	34	9	17	25	17
q	34	34	31	0	3
r	34	17	27	17	7
s	34	22	[3] 34	12	0
Total	136	82	[3] 109	54	27
Percent	100	60	[3] 80	40	20
Total W, X, and Z	400	227	[3] 267	173	[2] 133
Percent	100	57	[3] 67	43	[2] 33

[1] The total of the paired specimens equals the sum of the negative and the positive controls.
[2] Includes one nongroupable strain.
[3] No growth from one set of 34 kits, FPS plated at 15 days.

Moisture, Drying Surface, and Temperature

Two previous studies indicate that a greater number of recoveries of beta hemolytic streptococci can be obtained upon culturing filter paper strips, air dried after inoculation with these organisms in throat swabbings, than can be made from similarly inoculated strips which are not air dried before a 2–10 day transport period (*6,7*). In these two studies the effect of temperature was not explored.

Working in Zurich, a team of three investigators (*13*) found recovery of *Streptococcus pyogenes* following drying was improved if the relative humidity was very low or zero. A room temperature of 20° C. favored recovery, whereas temperatures of 30° and 37° C. decreased the colony count on culture following drying. The three investigators demonstrated that, after drying, 10 to 80 times as many streptococci remained on a glass coverslip as were washed free by 4 minutes of shaking followed by 10 minutes of soaking in the rinse water. This difficulty in removal of organisms from glass is comparable to removal from cotton (*14*). The successful use of filter paper strips for transport of streptococci is in conformity with the finding that viability and recovery of streptococci depend not only on drying but on inoculating on a rough surface and culturing the transport material itself rather than streaking or rinsing it (*13*).

Further documentation of the successful recovery of group A streptococci from filter paper strips, upon culture after a 2–10 day transit and holding period, is unnecessary. The equivalence of control and FPS techniques is evident in all group A tabulations.

Summary

The filter paper strip technique for transport and holding of throat swabbings for subsequent culture of beta hemolytic streptococci further was tested by investigators in five collaborating laboratories. Of these five, located in Georgia, Maryland, and California, the three

Table 5. Isolation of beta hemolytic streptococci from filter paper strips and controls by source and receiver

Source and receiver	Negative controls				Positive controls			
	Negative FPS	Positive FPS	Total	Percent agreement	Positive FPS	Negative FPS	Total	Percent agreement
Sources W and X								
p	30	7	37	81	25	6	31	81
q	34	3	37	92	[1] 21	6	[1] 27	[1] 78
r	35	2	37	95	23	7	30	77
s	32	2	34	94	23	8	31	74
Total	131	14	145	90	[1] 92	27	[1] 119	[1] 77
Source Z								
p	8	1	9	89	16	9	25	64
q	31	3	34	91	0	0	0	----
r	17	0	17	100	7	10	17	41
s	[2] 22	0	22	[2] 100	[2] 0	12	12	[2] 0
Total	78	4	82	95	23	31	54	43
Total W, X, and Z	209	18	227	92	115	58	173	66

[1] Includes one nongroupable strain.
[2] No growth.

in California served as source laboratories. Using two swabs for simultaneous swabbing on each patient, each source laboratory immediately inoculated a control culture and a paired FPS. Each source sent a set of 34 inoculated filter paper strips to each of four receiving laboratories. Of the FPS in each set, one-half were estimated to be positive on the basis of preliminary reading of controls. In all, 400 filter paper strips were received and held for variable time periods. From both controls and filter paper strips 306 strains of beta hemolytic streptococci were isolated, 305 of which were groupable. The findings were tabulated by streptococcal group, percentage agreement by positive and negative controls, and by source and receiver as well as by time held prior to plating.

The filter paper strip technique proved to be highly satisfactory for transport and holding of group A streptococci. Of the 206 strains of group A streptococci isolated, 106 were from controls and 100 were from FPS. This record of recovery, 52 percent from controls plated at once and 48 percent from filter paper strips held or in transit 2–17 days before culture, is remarkable in view of the geographic distribution of receiving laboratories and the fact that three of four receiving laboratories were relatively unfamiliar with the technique. For group A isolates, source and receiver achieved equally good percentage agreement with respect to negative controls and to recovery from filter paper strips air dried after inoculation.

Data on percentage recovery of groups B, C, and G streptococci by the filter paper strip technique are inconclusive. Half of the FPS paired with controls positive for B, C, or G were not air dried and one-sixth were plated at time intervals beyond the 2–10 day period designated for the study. Of 100 B, C, and G isolates, 33 percent were from FPS and 67 percent from controls. Any conclusion as to recovery is complicated by the conditions which obtained for those filter paper strips cultured and matched with controls positive for these groups of beta hemolytic streptococci, and additional studies are warranted.

Attention is directed to the necessity for adhering strictly to the described technique for throat swabbing and for handling filter paper strips. Because of the possible deleterious ef-

fects of high humidity or high temperature air drying is essential, even if a longer period is required, but air drying will not insure satisfactory recovery of streptococci if the swabbing is unsatisfactory.

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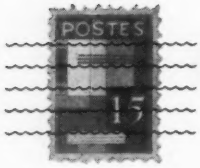
Use of Heptachlor on Crops Banned

The use of the pesticide heptachlor under conditions which leave residues on harvested crops was prohibited on January 19, 1960, by the Food and Drug Administration, through the rescinding of a regulation permitting small residues on harvested food and forage shipped interstate.

New scientific data have shown that in addition to residues of heptachlor, a breakdown product, called heptachlor epoxide, is present after heptachlor treatments, and that residues of epoxide appear in meat and milk when forage containing it is fed to experimental meat and dairy animals. No residues of heptachlor itself have been found in meat or milk. How much epoxide may be present under varying conditions and the toxicity of the substance have not been determined. No action will be taken against crops already treated within previous regulations.



INTERNATIONAL MAIL POUCH

Regionalization in Paraguay

The 7-month course to train auxiliary nurses in Encarnación was the first fruit of our efforts to demonstrate regionalization. It was the first full-time training for health personnel ever offered outside the capital of Paraguay. The 16 students will complete 1,050 hours of instruction and supervised practice. This is to be a permanent program with one such group being prepared in Asunción, the capital, and other groups in three regional health centers.

— ROBERT T. SCHOLES, M.D., *chief, health and sanitation division, U.S. Operations Mission, Paraguay.*

Cost Cutting

Mounted on motorcycles, two sanitary inspectors did the work of five by completing in 7 months their routine inspections as well as special survey work over an area of 2,000 square kilometers of Surinam. The motorcycles cost about half the salary of a single inspector.

—ROBERT BREWER, *former acting sanitary engineer, U.S. Operations Mission, Surinam.*

Santa Teresa

The new health center in Santa Teresa, Nicaragua, has sparked civic improvements. Even before all the equipment was installed, other changes were planned: a new marketplace and park, and improved water supply and garbage disposal systems. The mayor, the village priest, and the school authorities are most cooperative, and the villagers themselves are enthusiastic.

The staff of the Santa Teresa center and the second new center in Diriá were given an orientation course since some of them are inexperienced in this kind of health work. Their responsibilities are heavy because they are the only medical units in that part of Nicaragua. They designed a basic medical data form which was used to gather information house-to-house in the two communities. The survey's results will serve as a baseline for evaluating the effectiveness of the rural health centers.

Perhaps the most important task they face is to reduce the incidence of infestations of intestinal parasites. Of the first 100 people examined at the Santa Teresa center, 98 were found to be infected, some with as many as four different varieties of parasites. Gastroenteritis is the principal cause of death in Nicaragua.

The supervising sanitarian, with the sanitary engineer consultant and the Ministry of Public Health, worked out a plan for this rural area's excreta disposal. Sanitary latrines combined with the education efforts of the center's staff is expected to show definite results shortly.

—PATRICK J. SULLIVAN, *former chief, and* MAHLON H. HAWORTH, *former business manager, health and sanitation division, U.S. Operations Mission, Nicaragua.*

Promotion

One of our graduates has become sanitary foreman of the main construction camp of the Brokopondo dam project in Surinam. Two and a half years ago he started to work for us as a day laborer and his technical skill was limited to handtools and driving a car.

After working with the sanitary engineer, he can use a slide rule like an expert, perform chemical and bacterial tests for water treatment, assemble portable purification plants, and put into operation a complete water treatment plant as well as training its staff.

—ROBERT BREWER, *former acting sanitary engineer, U.S. Operations Mission, Surinam.*

Diagnosis of Streptococcal Infections

It has been estimated that about 2 million people living in the United States today have already had, or will develop, rheumatic fever at some time during their lives. Of these, more than 500,000 will probably die because of the rheumatic process or some complication developing directly from it.

Rheumatic fever most often strikes children between the ages of 5 and 15, and the resulting rheumatic heart disease causes about 50 percent of all heart disease in this age group. It is estimated that in the 5- to 19-year age group in this country there is a current annual incidence of about 60,000 cases of rheumatic fever. About half of these are recurrences, and the remainder are first attacks. It is the recurrent attacks of the fever which cause the actual damage to the heart itself.

While the past 40 years have shown a marked reduction in rheumatic fever mortality, the problem is far from solved. In 1957, rheumatic fever and rheumatic heart disease combined to cause the deaths of about 20,000 in the United States. However, by the application of what is currently known about these diseases, some real progress has been made.

What causes rheumatic fever is not fully understood, but research has shown that cases usually begin with a streptococcal infection—primarily of the throat. The specific pathogen has been identified as group A beta hemolytic streptococci.

Antibiotics can eliminate streptococci, and effective prophylaxis can prevent the secondary attacks of rheumatic fever. Indeed, penicillin prophylaxis appears to be accelerating the decline of rheumatic fever.

First attacks of rheumatic fever can be prevented through prompt treatment of streptococcal infection which entails the use of an antibiotic (preferably penicillin) for a period of 10 days. But therein lies the physician's dilemma. A "strep throat" cannot always be distinguished clinically from sore throats caused by other organisms, but every "strep throat" is a potential case of rheumatic fever.

Since there are many objections to indiscriminate penicillin therapy, the physician usually considers it advisable to delay treatment for 2 to 3 days until the causative agent can be identified by a throat culture. He is repeatedly forced to decide whether to postpone treatment until a definite diagnosis is made, and perhaps save the patient some money, as well as lower the risk of a future penicillin sensitivity, or to treat the infection with penicillin immediately on the chance that it is "strep."

To date, prevention of the first attack has been almost impossible to achieve, since there was no quick, certain way for the physician to identify streptococci. Now the fluorescent antibody technique has provided a means for overcoming this obstacle.

The fluorescent antibody test works this way: Antibodies for a specific disease are stained with a fluorescent dye and then dropped onto a slide which has been smeared with material taken from the patient whose disease is to be diagnosed. If the smear contains a germ for which the antibody is specific, the antibody will immediately attach itself to the germ. When the liquid containing the antibody is washed off the slide, the antibody and the germ will remain, and, under ultraviolet illumination, a greenish fluorescence resembling minute neon lights will show up on the slide. If the germ is not present in the specimen, the antibody will wash off the slide along with the liquid that contained it.

The use of the technique by State laboratories as a diagnostic aid to physicians must necessarily be a gradual, natural growth. Lack of trained personnel is only one of many problems connected with initiating such a service program in a State or community. Other difficulties involve submission and transportation

Coons Receives Lasker Award

A major contributor to progress in public health, Dr. Albert Coons was presented with the Lasker Award at the 1959 meeting of the American Public Health Association in Atlantic City, N.J., in October.

Dr. Coons developed the fluorescent antibody test in the early 1940's with associates at the Harvard School of Medicine, where he is continuing studies along these lines. He has been a career investigator with the American Heart Association since 1953.

of specimens from the physician's office to the laboratory, a system for reporting the results back to the physician, and the maximum number of tests that can be performed by a single technician in any given period. In addition, the necessary equipment—the ultraviolet light source, filters, and special microscope—is relatively expensive and not in plentiful, immediate supply.

Through the following actions, however, the Public Health Service is helping to extend the use of the test as rapidly as possible:

- Local personnel have been trained by the Communicable Disease Center and equipment left on indefinite loan in the areas that participated in the field tests.
- About 40 Public Health Service physicians assigned to State and local health departments held a special meeting in Philadelphia on October 27, 1959, to determine the best ways in which they could help health departments, medical societies, and heart associations throughout the country to take advantage of the new research avenues which the fast strep test has opened.
- A 2-week training course for laboratory personnel of 12 State health departments was held at the Communicable Disease Center in January 1960.
- Materials and equipment will be lent to laboratories as soon as they have personnel trained to use them.
- Financial assistance is provided through grants from the National Heart Institute for research projects and through State grants-in-aid for purchase of equipment.

Influenza Research Promoted by PHS Committee

Influenza research was encouraged by a meeting January 13, 1960, of the Public Health Service Committee of Investigators, composed of leading authorities on influenza and related diseases.

Committee members agreed to accelerate their own research during 1960 and to encourage long-range studies. All influenza research projects will receive special review at the National Institutes of Health and qualified projects will be approved rapidly.

Among subjects the committee cited as needing study were:

- Assessment of the value of vaccine given in the 1957 epidemic as to its possible degree of protection.
- The present degree of immunity of unvaccinated persons who had influenza in 1957.
- The physiological effects of influenza on cardiovascular and respiratory systems.
- The neuromuscular effects of influenza.

The Committee of Investigators was established on the recommendation of the Surgeon General's Advisory Committee on Influenza Research.

Members of the Committee of Investigators are: Dr. Robert Wagner, University of Pennsylvania, chairman; Dr. George Burch, Tulane University; Dr. Fred M. Davenport and Dr. Thomas Francis, University of Michigan; Dr. Ivan Bennett, Johns Hopkins University; Dr. George Hirst, Public Health Research Institute of the City of New York, Inc.; Dr. Maxwell Finland, Boston City Hospital; and Dr. Roderick Murray, National Institutes of Health, Public Health Service.

Overweight children usually become overweight adults, according to a study, spanning 20 years, of 200 residents of Hagerstown, Md.

Relationship of Excess Weight in Children and Adults

SIDNEY ABRAHAM and MARIE NORDSIECK

THE ADVERSE effects of obesity upon health have been reported in life insurance and epidemiological studies (*1–4*). These reports have prompted investigators to employ various remedial methods and approaches to obesity (*5–9*).

The department of nutrition of the Harvard School of Public Health evaluated two approaches to weight control programs: individual counseling and group therapy (*10*). A 3-year followup showed that a majority of the 147 subjects failed either to reduce or to maintain a reduced weight. Stunkard and McLaren-Hume reviewed the literature of the past 30 years on results of treatment for obesity and found the results to be "remarkably poor" (*11*). Their own efforts with a group of outpatients were not successful in either reducing weight or maintaining a reduced weight for 2 years after treatment.

Young and others also reported the lack of success in a weight control program, but suggested the importance of childhood excess weight status as one of the factors determining adult excess weight status and of subsequent problems in weight control (*12*). They found that relative success was achieved in overcoming obesity when it was a recent development in the adult years. Mullin also reported, in a retrospective study, on the role of childhood obesity in adult obesity (*13*). He suggested that a persistent childhood obesity is reflected in a large proportion of adult obesity.

Height-weight data on school children examined some 20 years ago in Hagerstown, Washington County, Md., by the U.S. Public Health Service, presented an opportunity for a prospective study of the relationship of the weight status of individuals in childhood and adult years. Previous observations suggesting a relationship between childhood and adult obesity have been based primarily on retrospective studies of obese adults who have been interviewed about the history of their weight status. Childhood heights and weights on record in the Hagerstown sample supplied data that did not rely on memory for testing the hypothesis that obese children tend to become obese adults.

Method

Physical examinations of school children in three elementary schools in Hagerstown were performed during the years 1937–39. These

Mr. Abraham is a statistician and Miss Nordsieck, program adviser in the Heart Disease Control Branch, Division of Special Health Services, Public Health Service.

records, containing height-weight data, are on file in the Public Health Service office in Hagerstown (*14*). Physical measurement data are available on 977 of the 1,204 boys and 966 of the 1,152 girls examined at ages 10 through 13 years. Cohorts were selected on the basis of available serial height-weight data.

The examiners measured heights without shoes. At the weighing, the children removed shoes, sweaters, or coats, but retained usual indoor clothing.

Table 1. Distribution of relative weight of school children 10–13 years of age in 3 schools in Hagerstown, Md., 1937–39

Relative weight	Boys		Girls	
	Number	Percent	Number	Percent
Total	977	100.0	966	100.0
60–69	0	0	1	0.1
70–79	4	.4	18	1.9
80–89	120	12.3	207	21.4
90–99	455	46.6	387	40.1
100–109	279	28.6	202	20.9
110–119	80	8.2	81	8.4
120–129	14	1.4	29	3.0
130–139	16	1.6	21	2.2
140–149	5	.5	9	.9
150 and over	4	.4	11	1.1

The weight status of each child was determined by using a relative weight method, defined as the percentage deviation of actual weight from the average weight for a given sex, age, and height. Average weights were obtained from the Baldwin-Wood height-weight tables (*15*). The distribution of these relative weights is shown in table 1.

Studies of the relationship of obesity to health and disease usually measure obesity in terms of departure of actual weight from a height-weight standard. Obesity or an excess accumulation of fat, therefore, is used interchangeably with overweight or excess weight above standard weight. The limitations of using height-weight tables in this study to determine true obesity were recognized (*16*). Total body weight is a measure of bone, muscle, and fat, and departure from average weight may be due to one or another or a combination of these body components. Overweight prevention and control is directed against overweight due to excess fat, primarily attributed to excess food intake over the energy demands of the individual; therefore an effort was made to identify the obese children in the overweight group.

For purposes of weight classification, children were placed in categories of average weight and overweight, and the population was arrayed from largest to smallest by relative weight. Fifty children or approximately 5 percent of the upper distribution of relative weight were chosen for each sex as overweight. The relative weight values of boys ranged from 180 to 116; for girls, from 200 to 124.

This selection of overweight subjects who have extreme relative weight values increases the likelihood that truly obese subjects have been chosen (*17*). The validity of relative weight measures as an indication of obesity is discussed in the statistical notes.

These findings indicate that, on the average, overweight children are fatter by measurement as well as weight than average weight children.

One hundred children were also selected for the "average weight" classification. Since the distribution of relative weight was skewed toward the higher values, average weight was computed by the median. Relative weights were 98 for boys and 97 for girls. Arbitrarily, we decided to use plus or minus five about 100. Therefore, average weights for the purpose of this study are the relative weight values from 95 through 104. In these categories, there were 425 boys and 290 girls. To select 50 children of each sex for this study, a 12 percent and 17 percent random sample of boys and girls in this weight category were taken.

Table 2 identifies relative weights of the study subjects in each weight classification with regard to the relative weights of the total school population.

Adult Followup

The adult followup was made in the summer of 1958 (table 3). Of the 200 children whose records were selected for the study, 174 or 87 percent were located. However, only 120 were used in this study since 47 were eliminated because of nonresidence in Washington County

Table 2. Distribution of relative weight of school population and of study group, 10–13 years of age, by major weight category, Hagerstown, Md., 1937–39

Relative weight	Boys		Girls	
	School population	Study group	School population	Study group
Total	977	100	966	100
Below average (less than 95)	320	0	435	0
Average (95–104)	425	50	290	50
Overweight, total	232	50	241	50
105–119	193	13	171	0
120–129	[1] 14	13	29	12
130–139	16	16	[1] 21	20
140–149	5	5	[2] 9	7
150 and over	[1] 4	3	11	11

[1] 1 in this weight category not sought due to inadequate records.
[2] 2 in this weight category not sought due to inadequate records.

and 7 because they were not available for interviewing.

Each interviewer carried a measuring stick and a portable scale for height and weight measures. Weight status was measured in terms of relative weight, computed as the percentage deviation of actual weight from average weight for a given height, age, and sex. Average weights were obtained from height-weight tables in the Medico-Actuarial mortality investigations of 1912 (*18*) and distributed by the Metropolitan Life Insurance Company. (Revised tables of average weights were a part of the "1959 Build and Blood Pressure Study," recently published by the Society of Actuaries (see p. 266). Publication followed preparation of this paper. An analysis, using these more recent figures, revealed no noteworthy change in the results obtained.)

Distribution for relative weights of adults was not available, but 20 percent or more above average weight was defined as marked overweight (*1*). Average weight was calculated in a manner similar to that for children whose relative weight values ranged from 95 through 104.

Average age of adults was 31 years. For men, ages ranged from 27 to 36 years, for women, from 26 to 35 years.

Of the 28 interviews with average weight men, 26 were used in the study and 2 for pretesting. One interview with an average weight woman was used for pretesting; all other interviews, a total of 29, were used in the study.

Interviews with 32 overweight men were used in the study and 2 were used for pretesting. Twenty-seven interviews with overweight women were used in the study and one was used in pretesting.

No bias was introduced by attrition since childhood weight status of those who were not interviewed did not differ from those who were. The statistical notes analyze the differences

Table 3. Result of followup of study group, by childhood weight status

Results	Total population		Men				Women			
			Average		Overweight		Average		Overweight	
	Number	Percent	Number	Percent	Number	Percent	Number	Percent	Number	Percent
Total	200	100	50	100	50	100	50	100	50	100
Located	174	87	45	90	42	84	41	82	46	92
Interviewed	120	60	28	56	34	68	30	60	28	56
Located but not interviewed	54	27	17	34	8	16	11	22	18	36
Out of county	*47*	-------	*13*	-------	*7*	-------	*10*	-------	*17*	-------
Not available for interview	*7*	-------	*4*	-------	*1*	-------	*1*	-------	*1*	-------
Cannot locate	23	-------	4	-------	6	-------	9	-------	4	-------
Died	3	-------	1	-------	2	-------	0	-------	0	-------

Revised Tables of Average Heights and Weights

In October 1959, the Society of Actuaries published the results of the largest statistical investigation ever attempted in the field of public health, entitled "1959 Build and Blood Pressure Study." The data cover the 20-year experience of 26 large life insurance companies. Five million policyholders are represented in the revised tables of average heights (with shoes) and weights given below.

AVERAGE WEIGHTS OF MEN

Graduated Weights (in indoor clothing) in Pounds

Height	Age Groups 15-16	17-19	20-24	25-29	30-39	40-49	50-59	60-69
5′ 0″	98	113	122	128	131	134	136	133
1″	102	116	125	131	134	137	139	136
2″	107	119	128	134	137	140	142	139
3″	112	123	132	138	141	144	145	142
4″	117	127	136	141	145	148	149	146
5″	122	131	139	144	149	152	153	150
6″	127	135	142	148	153	156	157	154
7″	132	139	145	151	157	161	162	159
8″	137	143	149	155	161	165	166	163
9″	142	147	153	159	165	169	170	168
10″	146	151	157	163	170	174	175	173
11″	150	155	161	167	174	178	180	178
6′ 0″	154	160	166	172	179	183	185	183
1″	159	164	170	177	183	187	189	188
2″	164	168	174	182	188	192	194	193
3″	169	172	178	186	193	197	199	198
4″	*	176	181	190	199	203	205	204

AVERAGE WEIGHTS OF WOMEN

Graduated Weights (in indoor clothing) in Pounds

Height	Age Groups 15-16	17-19	20-24	25-29	30-39	40-49	50-59	60-69
4′ 10″	97	99	102	107	115	122	125	127
11″	100	102	105	110	117	124	127	129
5′ 0″	103	105	108	113	120	127	130	131
1″	107	109	112	116	123	130	133	134
2″	111	113	115	119	126	133	136	137
3″	114	116	118	122	129	136	140	141
4″	117	120	121	125	132	140	144	145
5″	121	124	125	129	135	143	148	149
6″	125	127	129	133	139	147	152	153
7″	128	130	132	136	142	151	156	157
8″	132	134	136	140	146	155	160	161
9″	136	138	140	144	150	159	164	165
10″	*	142	144	148	154	164	169	*
11″	*	147	149	153	159	169	174	*
6′ 0″	*	152	154	158	164	174	180	*

* Average weights omitted in classes having too few cases.

between weight status of subjects who were not interviewed and those who were.

Replacements

Subjects who were lost from the initial study group were replaced in order to maintain the original number of 50 males and 50 females in each of the sex and weight categories. Random selections were made from the reservoir of average weight persons so classified originally in the school population. Replacements for the overweight males and females were obtained by selecting the next most overweight from the distribution of relative weight below the upper fifth percentile. By this method, of course, less grossly overweight persons as originally defined were included in the final overweight group. For boys, the relative weights of replacements ranged from 116 to 108, for girls, from 124 to 110. Because relative weights as low as 108 for boys and 110 for girls were included, it was decided to identify two classifications of overweight: moderately overweight, relative weights of 105 through 119, and markedly overweight, relative weight of 120 and more.

Results

Figures 1 and 2 illustrate the trend in weight status from childhood to adulthood of average weight and overweight children. These trends are summarized in tables 4 and 5, which show the comparison between childhood and adult weight status for males and females. For each sex, it is apparent that overweight children tend to become overweight adults more often than children of average weight. Of the 50 overweight boys, 43, or 86 percent, were overweight as adults. Of the 50 average boys, 21, or 42 percent, were overweight as adults. Approximately twice as many overweight boys were overweight adults in comparison to average weight boys. More striking differences in adult overweight status are noted in comparing overweight girls and average weight girls. Of the 50 overweight girls, 40, or 80 percent, were overweight as adults; only 9, or 18 percent, of the 50 average girls were overweight as adults. In both comparisons, the differences are statistically significant: for boys, chi-square=19.14, D.F.=1, $P<.001$; for girls, chi-square=36.01, D.F.=1, $P<.001$.

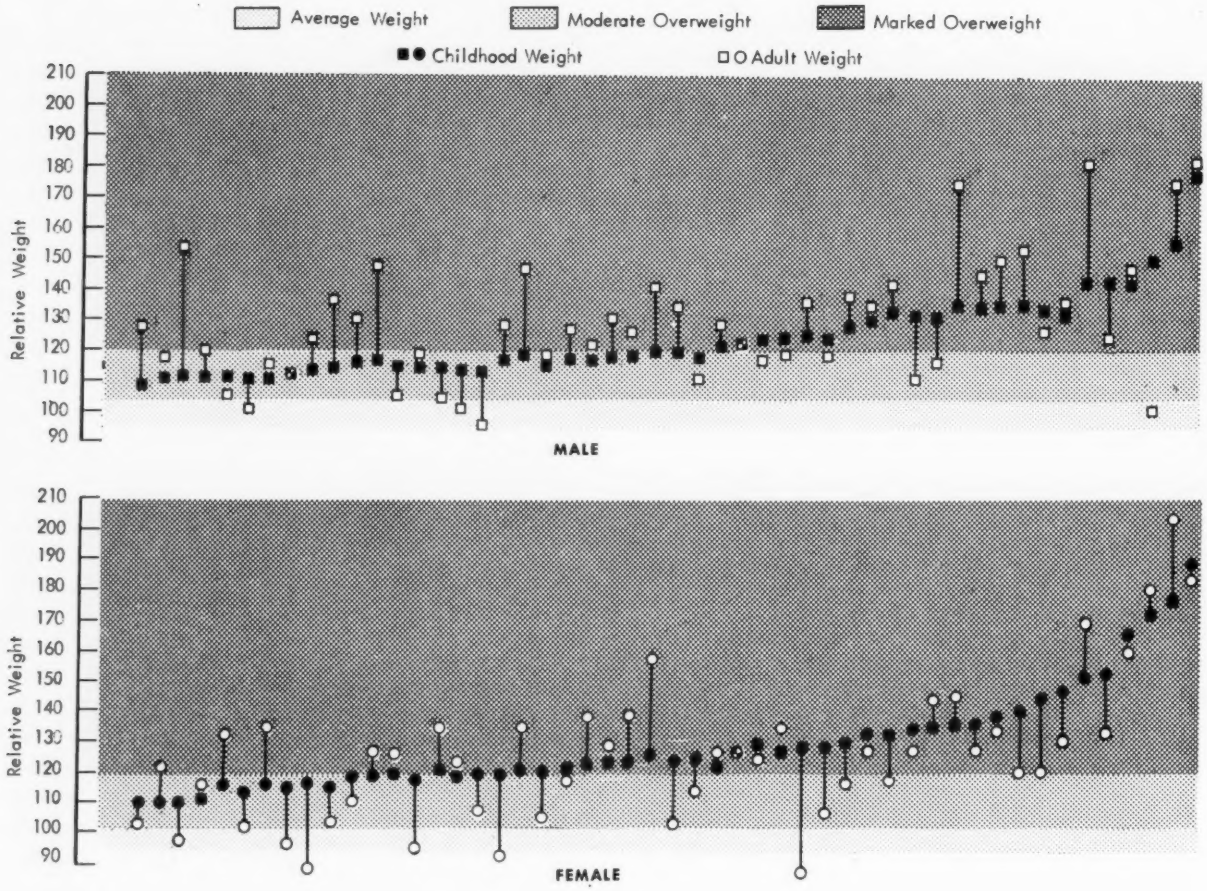
It is also apparent from these data that markedly overweight girls and boys are more likely to become overweight adults than the moderately overweight. Seven, or 50 percent, of the moderately overweight girls were average or less than average weight as adults. This observation contrasts with 3, or 8 percent, of the 36 markedly overweight girls who were average or less than average weight as adults. The same findings, but with less difference in percentage, are noted when a comparison is made of moderately overweight and markedly overweight boys; the percentages observed are 22 percent and 4 percent, respectively. These observations reflect the loss of girls and boys in overweight categories who were selected from the upper part of the distributions of relative weight. The data suggest that if, as originally planned, only those in the upper 5 percent of the distribution had been used, more of the overweight children would have fallen into adult overweight categories.

It is quite likely that some persons are in their present weight status because of efforts toward weight reduction or because of the effect of a disability or disease. Some information was gained by asking each person about his usual weight in contrast to his present weight, with the specification that the answer apply to a period at least 6 months prior to the date of interviewing. The results indicated no significant difference in mean relative weights for males and females for the two periods of time.

Discussion

Interest in overweight stems in great part from the role which this factor may play in the etiology of disease, particularly cardiovascular disease. The bulk of the data on weight control lies in the statistics in life insurance studies (*1*) which have shown repeatedly a significantly higher mortality rate for overweight persons than for persons of average and less than average weight. These findings have been supported also by data from the Framingham heart study conducted by the National Heart Institute of the Public Health Service. In the fourth year of followup of men aged 45–62 years, it was found that overweight was clearly associated with the risk of development

Figure 1. Adult weight status of average weight children of both sexes, 10 to 13 years of age, Hagerstown, Md., 1937–39



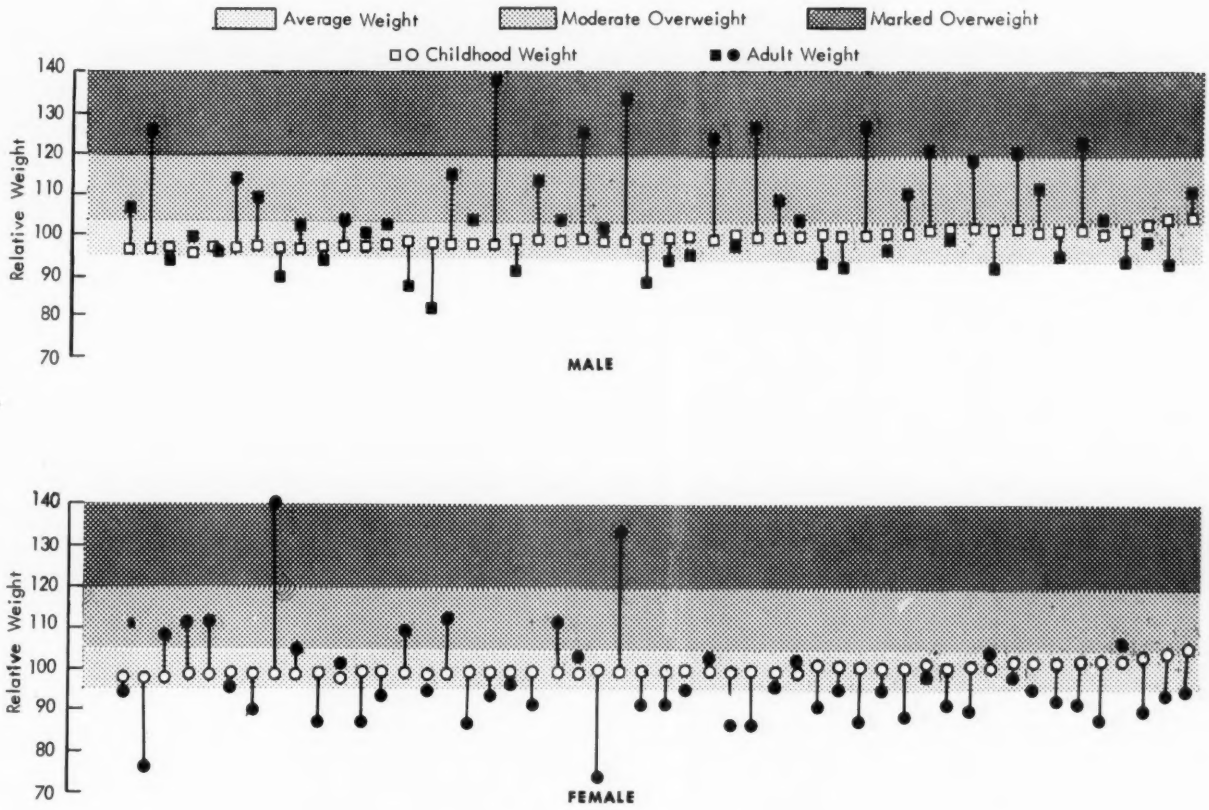
of coronary heart disease (*2*). Coronary heart disease incidence rates of overweight men were three times as great as those for men whose weight was below the median weight.

It has been assumed that if diseases, particularly cardiovascular diseases, are induced or adversely influenced by overweight, weight reduction would tend to decrease morbidity and

Table 4. Weight status by major category of selected male residents of Hagerstown, Md., as school children and as adults

Childhood weight	Selected male residents		Adult weight					
			Less than average and average weight (less than 105)		Moderately overweight (105–119)		Markedly overweight (120 and more)	
	Number	Percent	Number	Percent	Number	Percent	Number	Percent
Average weight (95–104)	50	100. 0	29	58. 0	11	22. 0	10	20. 0
Overweight, total	50	100. 0	7	14. 0	12	24. 0	31	62. 0
105–119	27	100. 0	6	22. 2	7	25. 9	14	51. 9
120 and more	23	100. 0	1	4. 3	5	21. 7	17	73. 9

Figure 2. Adult weight status of overweight children of both sexes, 10 to 13 years of age, Hagerstown, Md., 1937–39



mortality from such diseases. The effect of weight control on the mortality experience of insured persons has also been reported by life insurance studies (*19*). These studies have added impetus to weight control as a preventive measure against cardiovascular heart disease. It was found that weight reduction improved the health outlook for those persons who had lost enough weight to qualify for a new insurance rating. As an example, men originally limited to substandard insurance because they were moderately overweight, upon weight reduction had a lessened mortality rate of 113 percent of the standard, compared with

Table 5. Weight status by major category of selected female residents of Hagerstown, Md., as school children and as adults

Childhood weight	Selected female residents		Adult weight					
			Less than average and average weight (less than 105)		Moderately overweight (105–119)		Markedly overweight (120 and more)	
	Number	Percent	Number	Percent	Number	Percent	Number	Percent
Average weight (95–104)	50	100.0	41	82.0	7	14.0	2	4.0
Overweight, total	50	100.0	10	20.0	9	18.0	31	62.0
105–119	14	100.0	7	50.0	2	14.3	5	35.7
120 and more	36	100.0	3	8.3	7	19.4	26	72.2

the mortality rate of 142 percent for all moderately overweight males.

It has been found from studies and reports from clinics for weight control that guided efforts toward their goals are ineffective and impermanent. It would appear that early onset of overweight is an important factor to consider when persons apply for treatment. Education and therapy should be directed toward weight control in the early stages of life. According to Young and others, overweight is "probably a continuing reflection of other childhood characteristics" (*12*).

Summary

A followup was made of children aged 10 through 13 years whose serial height-weights were recorded some 20 years ago to determine their present adult weight status.

It was observed that overweight children tend to become overweight adults more often than children of average weight.

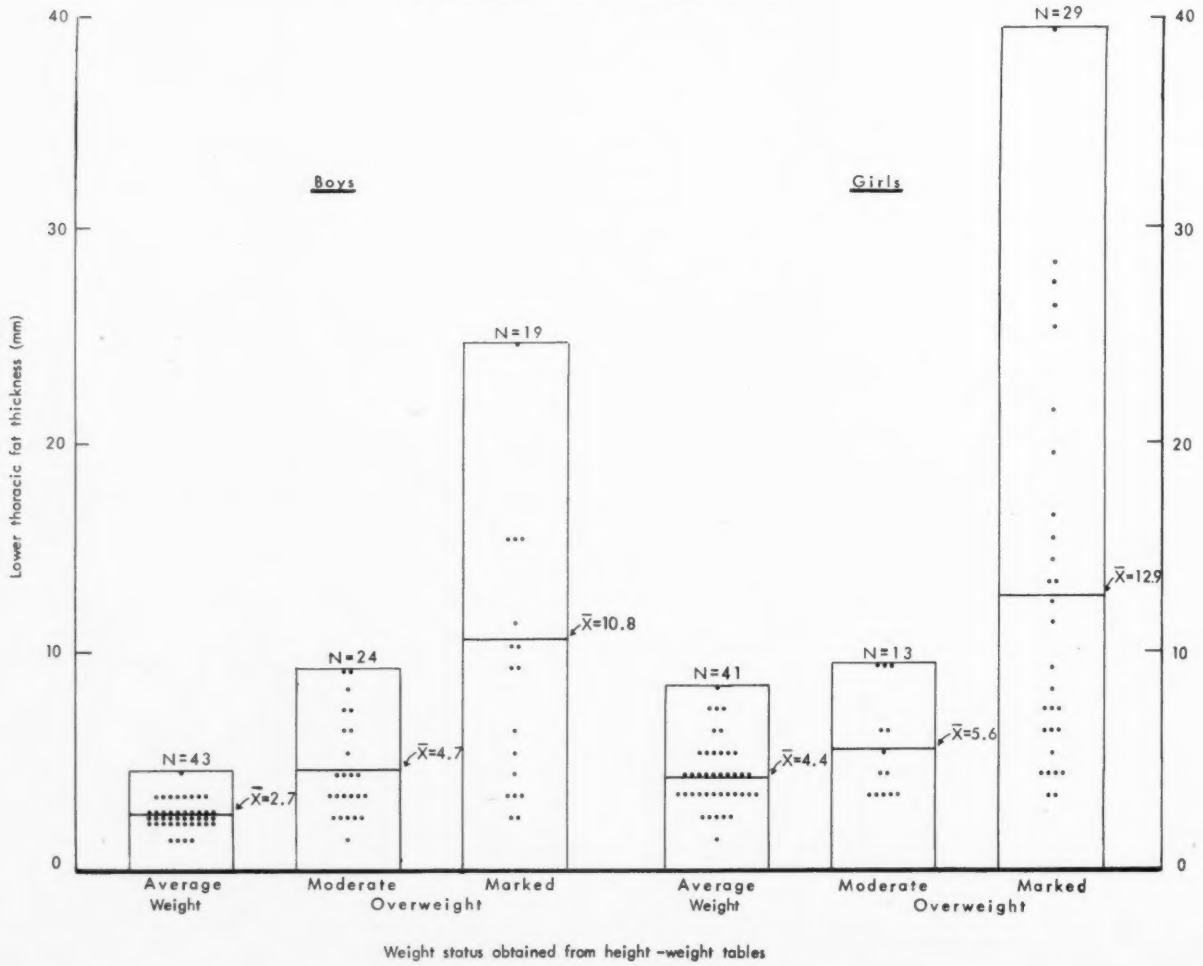
The difficulty that obese adults experience in weight control may be rooted in the fact that overweight children tend to become overweight adults. It may, therefore, be reasonable to suggest that part of the failure of traditional weight control activities is due to overemphasis on adult eating patterns.

STATISTICAL NOTES

Validation of Relative Weight Measures

The term "overweight" is used interchangeably in this study with the term "obesity." Since overweight is defined in terms of departure of actual weight from a height-weight standard, no specific measure of fat is available. An effort was therefore made to validate the overweight measure, expressed

Figure 3. Distribution of fat thickness in weight categories, by sex, of children 10 to 13 years of age, Hagerstown, Md., 1937–39



in terms of relative weight, with the measure of obesity. Chest X-rays were available on 86 boys and 83 girls in the study group. They were read for measurement of fat at the Fels Research Institute, Yellow Springs, Ohio, by Miss Joan A. Haskell. Measurements of fat in the lower thoracic region were taken at the level of the 10th rib on both right and left sides, perpendicular to the fat shadows (*20*). When X-rays of this particular site were faulty due to improper positioning or extension of the chest beyond the plate, fat measurements were taken at the ninth rib. In a few cases, the X-rays were completely unreadable at both the 9th and 10th rib site, and no measurement of fat thickness was attempted. This was unfortunate since these measurements represented some of the more obese subjects. A complete series of measures was made on two different occasions. Since reproducibility was high, a mean value of fat per individual was calculated.

One approach in evaluating the relationship between overweight and obesity is illustrated in figure 3. This shows the distribution of fat thickness in the lower thoracic region of designated weight categories for boys and girls. It is apparent that the distribution of fat thickness overlaps the weight categories.

Some average weight children had fat measures equal to those of moderately and markedly overweight children. There were also some with larger fat measures. This occurred more frequently in girls than boys.

The difference in means of fat thickness, as indicated in figure 3 and table 6, shows an increase in mean fat thickness with the increase in weight status. For boys, the fat thickness was four times as great for the markedly overweight as for the average weight (10.8 mm. vs. 2.7 mm.). The comparison was approximately three times as great for girls (12.9 mm. vs. 4.4 mm.).

Comparison of the means of weight categories was made by the test of the significance using the F distribution in the analysis of variance after the fat distributions were normalized using McCall's technique, cited by Garn (*21*). The transformation to normalized T-score tended to normalize the fat distribution and provided equal variances. The F test showed a significant difference in means: Boys $F_{.01}$ (2,83) =4.9, F=36.8; girls, $F_{.01}$ (2,80) =4.9, F=20.7.

F tests permit an analysis which rejects the null hypothesis that all of the means are equal, but they do not provide a procedure for comparing specific means with one another. Multiple compari-

Table 6. Measurement of fat thickness of children by major weight category and by sex

Weight group	Boys				Girls			
	Number	Fat thickness (mm.)			Number	Fat thickness (mm.)		
		Mean	Standard deviation	Range		Mean	Standard deviation	Range
Average weight	43	2. 7	0. 56	1. 7–4. 3	41	4. 4	1. 6	1. 8–8. 4
Overweight:								
Moderately	24	4. 7	2. 3	1. 5–9. 5	13	5. 6	2. 5	3. 2–9. 8
Markedly	19	10. 8	6. 4	2. 9–24. 3	29	12. 9	9. 3	3. 3–39. 1

Table 7. Comparison of fat thickness in weight categories of children 10–13 years of age, Hagerstown, Md., 1937–39

Comparison	Confidence limits[1]	
	Male	Female
Average weight-overweight	13. 8±3. 8	8. 7±4. 3
Average weight-markedly overweight	−17. 1±4. 8	−13. 0±4. 8
Moderately overweight-markedly overweight	−6. 5±5. 4	−8. 6±6. 6
Average weight and moderately overweight-markedly overweight	−11. 9±4. 6	−10. 8±4. 6

[1] There is evidence, using the q statistic at the 5 percent level to reject the zero value for all the comparisons made, using the following formula: $\overline{X}_1-\overline{X}_2\pm\frac{\text{Student range}}{\sqrt{2}}\sqrt{\text{Mean square for error}\left(\frac{1}{n_1}+\frac{1}{n_2}\right)}$

son tests provide this method (*22*). Table 7 shows the statistical evaluation of these comparisons.

It is evident that there is a significant difference in fat thickness between average weight and overweight children, between a combination of average and moderately overweight with markedly overweight, between moderately and markedly overweight, and between average and markedly overweight children. These findings indicate that the markedly overweight children had, on the average, a larger measure of fat thickness than those selected from the remainder of the designated area

Table 8. Initial selections and replacements for study of male residents of Hagerstown, Md., by childhood weight status in major weight categories

Childhood weight status	Initial group			Final group		
	Number in group	Number available	Number not available	Number in group	Number available	Number not available
Average weight						
Total	50	28	22	50	26	24
95–96	2	[1] 1	1	4	0	4
97–98	12	7	5	14	7	7
99–100	20	[1] 13	7	18	12	6
101–102	10	6	4	11	6	5
103–104	6	1	5	3	1	2
Overweight						
Total	50	34	16	50	32	18
105–119	13	[1] 10	3	27	9	18
120–129	13	7	6	7	7	0
130–139	16	[1] 11	5	10	10	0
140–149	5	3	2	3	3	0
150 and over	3	3	0	3	3	0

[1] Interviewed but not included in the final study group because used for presurvey testing.

Table 9. Initial selections and replacements for study of female residents of Hagerstown, Md., by childhood weight status in major weight categories

Childhood weight status	Initial group			Final group		
	Number in group	Number available	Number not available	Number in group	Number available	Number not available
Average weight						
Total	50	30	20	50	29	21
95–96	3	1	2	1	1	0
97–98	10	7	3	18	7	11
99–100	27	17	10	21	17	4
101–102	8	[1] 4	4	7	3	4
103–104	2	1	1	3	1	2
Overweight						
Total	50	28	22	50	27	23
105–119	0	0	0	14	0	14
120–129	12	8	4	17	8	9
130–139	20	[1] 10	10	9	9	0
140–149	7	4	3	4	4	0
150 and over	11	6	5	6	6	0

[1] Interviewed but not included in final study group because used for presurvey testing.

of the distribution of relative weight. However, it should be stated that, on an individual basis, some of the overweight children, particularly the moderately overweight, could be classified as overweight not due to fat but due to frame or muscular development.

Bias From Followup Attrition

Locating and interviewing children originally examined in 1937–39 for a prospective study raised the question of how many of the selected study group could be found in 1958. Losses might introduce a bias as the weight status of the average and overweight individuals located and interviewed might not be representative of the average and overweight categories as initially selected. Tables 8 and 9 show the number of average weight and overweight males and females who were either available for interview or not available for interview in the original study selection, and the replacements made for those who were not available.

Bias is minimized in the average weight group because of the method used in selecting individuals for this category. The range of weights was plus or minus 5 percent about the relative weight of 100. This narrow range tended to decrease the difference between the weight status of those individals interviewed and those individuals not interviewed. The difference between means was statistically not significant. For males of average weight, the mean relative weight of individuals not interviewed was 100.0 and of subjects was 99.7 ($.2>P>.1$). For females of average weight, the contrast in mean relative weights was 99.9 as compared to 99.8 ($P>.9$).

The problem of attrition is more pertinent in the overweight than in the average weight category, since the range of relative weight selected from the distribution of relative weights of the total population varied from the relative weight of 180 to 116 for males and from 200 to 124 for females. The hypothesis that there is no significant difference between the distribution of relative weight of those persons who were interviewed and those who were not interviewed was tested by using the chi-square statistic. This test indicated that the difference between the groups could have arisen by chance ($.7>P>.5$) and ($.8>P>.7$).

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Health Manpower, 1930–75

WILLIAM H. STEWART, M.D., and MARYLAND Y. PENNELL, M.Sc.

HEALTH manpower is a matter of increasing concern to the United States in view of the rapid rate of growth of the population. The number of persons in the 48 States and the District of Columbia in mid-1959 is estimated at 177,128,000; by 1975 it is predicted to be 235,246,000, an increase of 33 percent. Whether an adequate supply of physicians, dentists, nurses, and other health personnel can be provided for the future depends on immediate planning for increased numbers of graduates in the health professions within the next few years.

Current Physician (M.D.) Supply

With an estimated 235,000 physicians in mid-1959, excluding the graduates of that year, the ratio of physicians to population now is 132.7 per 100,000 persons. Over the past 30 years the ratio has ranged between 125 and 135.

The latest count of the number of physicians in the 1958 American Medical Directory (*1*) indicated that there were 226,625 physicians in the 48 States and the District of Columbia in mid-1957. This number of physicians includes all those in the Federal Government service regardless of their actual location. The ratio is 132.4 per 100,000 total population including the Armed Forces overseas.

In Alaska in mid-1957 there were 101 non-Federal physicians or 62 per 100,000 civilians; in Hawaii, 574 physicians or 104 per 100,000 civilians. Outlying areas had even relatively fewer physicians (excluding those in Federal Government service).

Dr. Stewart serves as chief and Mrs. Pennell is a statistician of the Division of Public Health Methods, Public Health Service.

Area	*Number of non-Federal physicians*	*Physicians per 100,000 civilians*
American Samoa	3	15
Canal Zone (and the Republic of Panama)	187	19
Caroline Islands	5	12
Guam	17	40
Mariana Islands	1	13
Marshall Islands	2	14
Puerto Rico	931	41
Virgin Islands	24	92

Physicians range in age from under 25 years to 90 and older. Among the 226,625 in the United States in mid-1957, about 800 were younger than age 25. At the other end of the scale were about 30,000 physicians aged 65 and over, of whom only 8,000 were reported in the directory as retired or not in the practice of medicine. (An additional 3,000 younger physicians were also counted as retired or not in practice.)

The detailed age distribution of the physicians is given below:

Age group	*Number*	*Percent*
All ages	226,625	100.0
Under 30 years	23,235	10.3
30–34	34,163	15.1
35–39	31,185	13.8
40–44	28,635	12.6
45–49	27,219	12.0
50–54	21,815	9.6
55–59	16,817	7.4
60–64	13,021	5.7
65–69	10,253	4.5
70–74	8,250	3.6
75–79	6,057	2.7
80 and over	5,388	2.4
Unknown	587	.3

NOTE: Age is as of the beginning of the year 1957, based on the year of birth shown on the individual physician punchcard supplied by the American Medical Association to the Public Health Service.

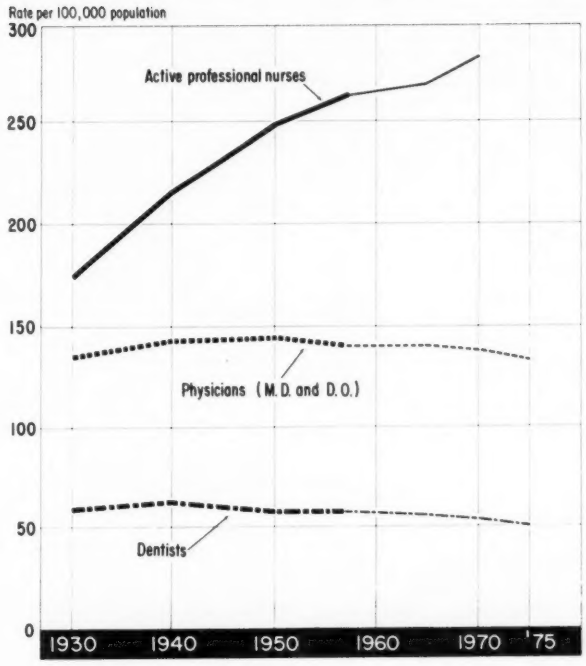
Of the physicians alive in 1957, about 86 percent may be expected to be still living in 1965 and about 68 percent, in 1975. This number of survivors at future dates is ascertained by applying the 1956 age-specific white male mortality rates to the number of physicians in each age group, on the assumption that physicians die at about the same rate as white males of similar age in the total population. The assumption is consistent with the number of deaths reported annually to the American Medical Association.

Deaths of physicians account for 3,500 to 4,000 annual losses to the profession. Each year about 7,400 to 7,800 newly licensed physicians—graduates from medical schools in the United States, Canada, and other foreign countries—are added to the profession. Thus the annual net gain in the number of physicians is about half the number of new licentiates.

The 85 medical schools in the United States graduated 6,895 physicians in the academic year 1958–59 (*2*). The average (median) age at graduation is now about 26 years, the same as prior to World War II (*3*, *4*). After this war and the Korean conflict the postponed education of veterans resulted in an increase to 28 years for median age at graduation for the class of 1950. By 1954, the median had declined to 27 years, with a further decline to 26 years by 1956. The tabulation based on recent graduates listed in the 1958 American Medical Directory shows that the disparity between ages at graduation has likewise declined. The middle 50 percent of the graduates covered a span of 5.3 years in 1950 as contrasted with 2.3 years for those graduated in 1956.

About 12 percent of the new additions to the profession in this country since 1950 were educated outside the United States. Of the physicians licensed to practice for the first time in this country in 1958, nearly 150 were graduates of Canadian schools and 1,166 were graduates of other foreign schools. The foreign school graduates include an estimated 400 American citizens who had gone to other countries for their medical education. A tabulation of recent licentiates graduated from Canadian and other foreign schools indicates that they are older, as a group, than those who enter the profession directly after graduation from U.S. medical

Trend in health manpower



schools. The median ages of the Canadian and other foreign school graduates are 30 and 36 years, respectively, when they obtain their first license to practice in the United States, as contrasted with age 26 for U.S. school graduates who are counted as entering the profession upon graduation rather than licensing.

Future Supply of Physicians (M.D.)

The future supply of physicians in the United States depends on (*a*) the current numbers now in the profession and their mortality, (*b*) the graduating classes of medical schools in this country, and (*c*) additions to the profession from Canadian and other foreign medical schools.

Of the 226,625 physicians (M.D.) in the United States in mid-1957, about 195,000 may be expected to be still alive in 1965. Between 1957 and 1965 the annual number of graduates of U.S. medical schools is planned to increase from about 6,800 to as many as 7,400. This reflects the development of new schools and expanded enrollment in existing schools, according to the American Association of Medical Colleges. During the same period the annual number of new licentiates graduated from Ca-

Table 1. Physician supply in 1975 based on number of graduates of U.S. medical schools at level currently planned and at level required for maintaining the 1957 national ratio of physicians to population in 1975

Year	Physicians (M.D.)		Graduates of U.S. medical schools [3]		New licentiates graduated from other medical schools [4]		Deaths among those in the profession [5]
	Number [1]	Per 100,000 population [2]					
	Level currently planned						
1957	226,625	132.4	6,796		1,164		
1958			6,861	20,552	1,316	3,680	11,507
1959			6,895		1,200		
1960	239,350	132.9	7,070		1,000		
1961			7,130		950		
1962			7,200	36,010	900	4,500	19,910
1963			7,270		850		
1964			7,340		800		
1965	259,950	132.8	7,410		750		
1966			7,410		750		
1967			7,410	37,050	750	3,750	21,750
1968			7,410		750		
1969			7,410		750		
1970	279,000	130.5	7,410		750		
1971			7,410		750		
1972			7,410	37,050	750	3,750	23,700
1973			7,410		750		
1974			7,410		750		
1975	296,100	125.9	7,410		750		
	Level required to maintain 1957 physician-population ratio						
1965	259,950	132.8	7,610		750		
1966			7,820		750		
1967			8,160	41,040	750	3,750	21,740
1968			8,540		750		
1969			8,910		750		
1970	283,000	132.4	9,120		750		
1971			9,430		750		
1972			9,690	48,570	750	3,750	23,820
1973			10,090		750		
1974			10,240		750		
1975	311,500	132.4	10,360		750		

[1] For 1957, number shown in American Medical Directory 1958, table 1. For future years, numbers computed by method outlined in "Physicians in the United States: Projections 1955–1975," by G. St.J. Perrott and Maryland Y. Pennell. J. M. Educ. 33: 638, September 1958.

[2] Rates based on total population of the United States, including Armed Forces overseas, as of July 1; U.S. Bureau of the Census, Current Population Reports, Population Estimates, Series P–25, No. 187, Nov. 10, 1958 (p. 16, Series II). Thousands of persons: 171,196 in 1957; 180,126 in 1960; 195,747 in 1965; 213,810 in 1970; 235,246 in 1975.

[3] Figures for 1957 and 1958 published in J.A.M.A. (Education Number) 168: 1503, Nov. 15, 1958; preliminary number for 1959. Figures for 1960–64 estimated by Public Health Service on basis of current enrollments. Figure for 1965 furnished by American Medical Association to House of Representatives Committee on Interstate and Foreign Commerce (85th Cong., 1st sess.); see Medical School Inquiry, p. 243. Figures for 1966–75 estimated by Public Health Service.

[4] New licentiates graduated from foreign schools: 1,014 in 1957 and 1,166 in 1958; J.A.M.A. (State Board Number) 170: 603, May 30, 1959. Licentiates of Canadian schools not reported by A.M.A. estimated as 150 per year. Figures for 1959–75 estimated by Public Health Service.

[5] Deaths computed on basis of 1956 age-specific white male mortality; National Office of Vital Statistics, Special Reports 6: 48, June 19, 1958 (table 2). Age distributions of physicians in 1957 of recent graduates of American medical schools and of recent licentiates graduated from Canadian and foreign medical schools were obtained from individual physician punchcards supplied to Public Health Service by American Medical Association.

nadian and other foreign medical schools may decrease. A conservative estimate for the year 1965 is 750, of whom 100 to 150 are graduates of Canadian schools and the balance are graduates of other foreign schools.

As shown in table 1, the number of physicians is expected to be nearly 260,000 in 1965, with a ratio of 132.8 physicians per 100,000 population (*5*). This 1965 ratio is almost the same as that of 1957 but shows a decline from the 134.9 level of 1949.

From 1965 to 1975, the annual number of graduates of U.S. medical schools may continue at the level of about 7,400 in accordance with the currently planned output of these schools. These graduates may be supplemented by an average of 750 graduates of Canadian and other foreign schools newly licensed each year. After death has taken its toll from both those already in the profession and the new additions, the number of physicians is expected to be about 279,000 in 1970 and 296,000 in 1975. The physician-population ratio will decline from the 1965 level of 132.8 physicians per 100,000 population to 130.5 in 1970 and still further to 125.9 in 1975.

If it is assumed that the ratio of physicians to population which prevailed in 1957 is the appropriate goal for 1975, there will be need for 311,500 physicians, instead of the 296,100 expected on the basis of the level of U.S. school output currently in sight. To obtain this total will require about 10,360 graduates of U.S. medical schools in the year 1975. This number of graduates is nearly 3,000 above the number now expected under current plans. Such an increase will have to be met through the expansion of existing schools and the construction of about 25 new schools, some with 2-year and some with 4-year programs.

Physicians (D.O.)

In 1930, the United States had approximately 10,300 doctors of osteopathy. By 1959 the number had increased to 14,100, giving a ratio of 8.0 per 100,000 population (table 2).

The six schools of osteopathic medicine graduated 469 physicians (D.O.) in 1959 (*6,7*). Currently planned enrollments indicate that by 1965 the annual graduating class may be increased to about 525.

If the output of these schools continues at the same level during the following decade, the supply of osteopathic physicians is expected to reach 16,700 by 1975, with the ratio declining to 7.1 doctors per 100,000 persons.

Dentists

Increases in dentist supply have been lagging behind population growth for more than a generation. From fewer than 75,000 dentists in 1930, the total supply in the 48 States and the District of Columbia has grown to almost 100,000 at the present time. Yet there are now only 56 dentists per 100,000 persons as compared with a ratio of 59 in 1930.

The dentist totals (table 2) include those in the Federal Government service and those retired or not in practice, but exclude graduates of the years concerned (*8*). While nearly all of the dentists of 1930 were of working age and active in the profession, today's dentist supply includes a large proportion who are inactive. As a result, the number of active dentists in relation to population has fallen even more steeply, dropping to only 49 per 100,000 persons in 1959, according to estimates prepared by the Public Health Service, Division of Dental Resources.

In mid-1957, one-quarter of the dentists were 60 years of age or older (*9*), as shown below:

Age group	*Number*	*Percent*
All ages	97,610	100.0
Under 30 years	7,492	7.7
30–34	12,539	12.8
35–39	13,137	13.4
40–44	9,752	10.0
45–49	9,249	9.5
50–54	10,556	10.8
55–59	10,355	10.6
60–64	9,651	9.9
65–69	6,233	6.4
70–74	3,720	3.8
75–79	2,714	2.8
80 and over	2,212	2.3

Alaska had 47 non-Federal dentists, or 28 per 100,000 civilians in 1958. With 356 non-Federal dentists in Hawaii, the ratio was 62 per 100,000 civilians.

The U.S. dental schools number 47, having risen from 39 at the end of the war. In the

academic year 1957–58 they graduated 3,083 dentists (*10*). The median age at graduation is now about 26 years, having been 28 years in the period 1950–54 and 25 years prior to World War II (*9*).

Although the annual number of graduates is nearly 80 percent more than the number graduated 10 years earlier, this expansion has not produced enough new dentists to maintain the pre-war dentist-population ratio. Furthermore, at currently planned levels of school output the ratio of dentists to population will continue its steady decline, as illustrated in the accompanying chart.

The annual number of graduates is expected to increase to nearly 3,500 by 1965. Unless there are further increases, however, the total number of dentists in the United States in 1975 will reach about 118,000. This number will be equivalent to only 50 dentists per 100,000 persons, of whom 46 will be active in the profession.

To regain the 1958 dentist-population ratio will require 133,250 dentists in 1975. An addi-

Table 2. Supply of physicians, dentists, and active professional nurses: United States, 1930–59, with projections to 1975

Year	Physicians			Dentists [3]	Active professional nurses [4]
	Total	M.D. [1]	D.O. [2]		
	Estimated number				
1930	164, 900	154, 600	10, 300	73, 100	214, 300
1940	187, 600	175, 200	12, 400	81, 700	284, 200
1950	216, 200	203, 500	12, 700	86, 900	375, 000
1957	240, 300	226, 600	13, 700	97, 600	445, 000
1958	244, 500	230, 600	13, 900	98, 540	460, 000
1959	249, 100	235, 000	14, 100	99, 400	467, 000
1965	274, 800	259, 900	14, 900	106, 700	526, 000
1970	294, 900	279, 000	15, 900	112, 900	608, 000
1975	312, 800	296, 100	16, 700	118, 100	----------
	Rate per 100,000 population [5]				
1930	133. 9	125. 5	8. 4	59	175
1940	142. 0	132. 6	9. 4	62	216
1950	142. 5	134. 2	8. 3	57	249
1957	140. 4	132. 4	8. 0	57	263
1958	140. 5	132. 5	8. 0	57	268
1959	140. 5	132. 7	8. 0	56	267
1965	140. 4	132. 8	7. 6	55	269
1970	137. 9	130. 5	7. 4	53	284
1975	133. 0	125. 9	7. 1	50	----------

[1] Number of M.D.'s for 1957 from American Medical Directory, 1958; data for prior years based on earlier directories; projections by Public Health Service (see metholodogy in table 1).

[2] Number of D.O.'s for 1957 from A Statistical Study of the Osteopathic Profession, December 31, 1957; data for prior years based on survival of graduates of U.S. schools of osteopathy; projections by Public Health Service.

[3] Number of D.D.S.'s for 1950–58 from Distribution of Dentists in the United States by State, Region, District and County (annual issues), adjusted to exclude graduates of years concerned; data for prior years based on survivals of graduates of U.S. dental schools; projections by Public Health Service.

[4] Number of nurses for 1958 from Facts About Nursing, 1959 edition; 1957 figure is midpoint between 1956 and 1958 totals; data for prior years based on census enumerations, adjusted to exclude student nurses; projections by Public Health Service.

[5] Rates for physicians and dentists based on total population including Armed Forces overseas since persons in Federal service outside the U.S. are included. Rates for nurses based on total population excluding Armed Forces overseas since nurses in Federal service outside the U.S. are excluded.

tional 2,700 graduates will be needed that year above the 3,500 currently planned for existing schools. This means a 75 percent increase in training capacity.

Professional Nurses

The nurse-population ratio in the United States has increased almost fivefold since 1910, according to the Public Health Service's Division of Nursing Resources. The ratio now is 267 per 100,000 population, with an estimated 467,000 active professional nurses in the 48 States and the District of Columbia in mid-1959 (table 2). The total number of graduate professional nurses probably exceeds 800,000 including those who are inactive for any reason.

In Hawaii there were 1,681 active registered nurses, or 320 per 100,000 civilians in 1956 (*11*). Data for Alaska are not available.

The 1,145 schools of professional nursing enrolled about 113,000 students and graduated 30,410 nurses in the academic year 1957–58 (*12*). Admissions to these schools may increase markedly by the mid-sixties, with the annual number of graduations up to 37,000 by 1965 and still going higher.

The number of nurses in relation to population will increase in accordance with the currently planned output of nursing schools. The ratio is expected to be 284 nurses per 100,000 persons in 1970, with about 608,000 professional nurses in active practice.

Summary

The future supply of physicians is not expected to keep up with the greatly accelerated rate of growth of the population. The predictions take into account estimates of the graduates of medical schools in the United States, new licentiates graduated from Canadian and other foreign medical schools, and deaths among those in the profession.

The number of graduates of U.S. medical schools currently predicted for existing and planned schools is expected to increase from about 6,900 in 1959 to 7,400 in 1965. The number of physicians (M.D.) in the latter year will be about 260,000, or 132.8 per 100,000 population which is about the present ratio.

If the number of graduates of U.S. medical schools were to remain at about 7,400 per year between 1965 and 1975, while the foreign-educated physicians entering practice in this country leveled off at 750 per year, the number of physicians (M.D.) in 1975 would be increased to 296,000. The ratio, however, will decrease to 125.9 physicians per 100,000 persons. If the annual number of U.S. graduates were to be increased sufficiently to maintain the present physician-population ratio in 1975, the 1975 graduating class would have to be increased to approximately 10,360, in order to have 311,500 physicians (M.D.) in that year.

The number of osteopathic physicians is about 14,000, with 469 graduates in 1959. If the annual graduating class is increased to about 525, by 1975 the supply of physicians (D.O.) may reach 16,700. The ratio to population will have declined, however, from 8.0 to 7.1 doctors per 100,000 population.

Increases in dentist supply have been lagging behind the population growth despite large gains in the numbers being graduated. The annual number of graduates is expected to increase from the present 3,100 to nearly 3,500 by 1965. Unless there are further increases, the number of dentists in 1975 will be about 118,000, or 50 per 100,000 population. To regain the 1958 ratio of 56 dentists per 100,000 population requires 133,000 dentists in 1975 and an additional 2,700 graduates that year above the number currently planned.

The supply of professional nurses has more than kept pace with the population growth. With 467,000 nurses now active, the ratio is 267 per 100,000 persons. The annual number of graduates is expected to increase from 30,400 in 1958 to 37,000 in 1965 and continue upward. On this basis, the ratio is expected to be 284 active professional nurses per 100,000 population in 1970.

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(11) American Nurses Association: Facts about nursing: a statistical summary, 1959 edition. New York, p. 9.

(12) National League for Nursing: State approved schools of professional nursing, 1959 edition. New York, p. 40.

films

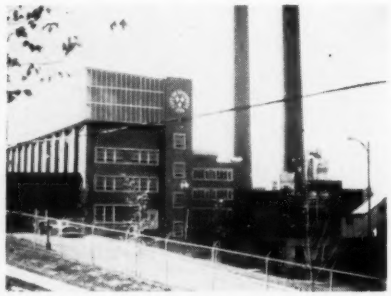
A Survey of Refuse Disposal Methods

16-mm. filmograph, color, sound, 358 feet, 10 minutes, 1959, cleared for television. (Order No. FG–328.)

Audience: Sanitarians and State and local officials responsible for refuse disposal facilities.

This filmograph demonstrates the advantages and disadvantages of all widely used methods of refuse disposal—ranging from open dumps, dumping in oceans and rivers, and backyard burning to metropolitan incineration and sanitary landfills.

The filmograph is available on short-term loan, in the United States only, from the Communicable Disease Center, Public Health Service, Post Office Box 185, Chamblee, Ga. It can be purchased from United World Films, Inc., 1445 Park Ave., New York 29, N.Y.



The Membrane Filter

35-mm. filmstrip, color, sound, 80 frames, 12 minutes, 1959, not cleared for television. (Order No. F–386.)

Audience: Anyone who might be expected to use the filter techniques.

Designed to familiarize audiences with the use of the membrane filter, this filmstrip depicts its advantages and disadvantages as compared with other methods of examining water, outlines the newest techniques and procedures, and shows the equipment required.

For short-term loan, in the United States only, the filmstrip is available from the Communicable Disease

Center, Public Health Service, Post Office Box 185, Chamblee, Ga. It can be purchased from United World Films, Inc., 1445 Park Ave., New York 29, N.Y.

Federal Publications

From Research to Classroom Laboratory, Part 2. A series of demonstrations on the science and engineering of man's environment for healthier living. *OM 1274; 1959; 52 pages.*

Eight experiments designed to bring an awareness of environmental health factors to high school students are reprinted from the *Science Teacher*.

Subjects investigated are fluoride contamination of food materials, additives in meat, taste and odor contaminants in drinking water, fluid metering, reducing evaporation of water by using hexadecanol, culturing bacteria on membrane filters, high-temperature, short-time pasteurization of milk, and determination of half-life.

Experiments given in part 1 are listed.

A Dental Society Reports on Budget Payment. A case study of the Kanawha Valley Dental Society payment plan. *PHS Publication No. 717; 1959; 28 pages.*

Organization, operation, and first year's utilization of a budget payment plan in which patients finance dental care through special bank loans at nominal interest rates are described.

The dentists' reasons for joining the plan, effects they believed it would have on dentist-patient relationships and financial aspects of practice, and the plan's possible contribution to better oral health standards for the community are discussed in relation to utilization patterns.

Principles for Planning the Future Hospital System. A report of proceedings of four regional conferences. *PHS Publication No. 721; 1959; 234 pages; $1.25.*

Regional conferences held in Chicago, New Orleans, Salt Lake City, and Washington, D.C., during April and May 1959 are recounted for groups or individuals concerned with hospital planning.

Divided into three parts, this report presents all the major speeches along with a condensation of each speech, a report from each of the 16 workshops and a summary of their activities, and a listing of registered participants.

The appendix contains background material used as a basis for discussion.

Patients in Mental Institutions, 1956. Part I. Public institutions for mental defectives and epileptics. Part II. Public hospitals for the mentally ill. Part III. Private hospitals for the mentally ill and general hospitals with psychiatric facilities. Part IV. Private institutions for mental defectives and epileptics. *PHS Publication No. 632; 1959; part I, 48 pages; part II, 72 pages; part III, 41 pages; part IV, 27 pages.*

Tabulations of basic statistical data on the movement of patient populations in mental institutions for each State and the United States are presented. The data were derived from the 30th annual census of patients in mental institutions.

Parts I and II contain detailed tables on first admissions and resident patient characteristics, on personnel, and on maintenance expenditures. Parts III and IV present characteristics of first admissions to private mental hospitals and private institutions for mental defectives. Part III also includes characteristics of patients discharged from psychiatric facilities of general hospitals. Scope and limitations of the data are discussed, and a section on definitions is included in each part.

Sources of Morbidity Data, Listing Number 7, 1959. *PHS Publication No. 716; 1959; 88 pages.*

Descriptions of 116 current morbidity statistics projects are grouped according to disease category or injury. Projects are indexed by type of data collection, organizations responsible for the research (by State), and principal investigators. Status of incompleted projects from previous listings is given in the section of supplementary notes.

The listings are published primarily for the use of research workers and persons planning public health programs. Tearsheets of the project descriptions are available for persons who inquire about studies of a particular type.

Proceedings, 1959 Annual Conference of the Surgeon General, Public Health Service, and the Chief, Children's Bureau, with State and Territorial Health Officers. *PHS Publication No. 722; 1960; 27 pages.*

Recommendations and actions of the Association of State and Territorial Health Officers are presented in separate sections for each of its standing and special committees and for the Long-Range Planning Subcommittee.

Committees cover Federal relations, environmental sanitation, hospitals and mental health, infectious diseases, long-term illness and health of the aging, maternal and child health, health and medical services, research, civil defense, Indian affairs, and migrant labor.

Resolutions adopted by the Association of State and Territorial Health Officers are also presented. Officers and executive committee members of the association are listed for 1958–59 and 1959–60.

This section carries announcements of new publications prepared by the Public Health Service and of selected publications prepared with Federal support.

Unless otherwise indicated, publications for which prices are quoted are for sale by the Superintendent of Documents, U.S. Government Printing Office, Washington 25, D.C. Orders should be accompanied by cash, check, or money order and should fully identify the publication. Public Health Service publications which do not carry price quotations, as well as single sample copies of those for which prices are shown, can be obtained without charge from the Public Inquiries Branch, Office of Information, Public Health Service, Washington 25, D.C.

The Public Health Service does not supply publications other than its own.

Echoes

THE NATIONAL HEALTH SURVEY*

SCOPE AND METHOD OF THE NATION-WIDE CANVASS OF SICKNESS IN RELATION TO ITS SOCIAL AND ECONOMIC SETTING

By GEORGE ST. J. PERROTT, *Principal Statistician*, CLARK TIBBITTS, *Field Director*, and ROLLO H. BRITTEN, *Senior Statistician*, *United States Public Health Service*

During the winter of 1935–36 the United States Public Health Service inquired into the state of the Nation's health and underlying social and economic factors by means of a house-to-house canvass of over 700,000 households in urban communities in 18 States [1] and 37,000 households in rural areas in 3 States. The present paper sets forth the purpose and scope of the survey, outlines in some detail the method of sampling and canvassing, compares various aspects of the population with 1930 Census data as a rough measure of the reliability of the Health Survey sample, and records the major definitions employed in the survey. Subsequent papers to be published in the PUBLIC HEALTH REPORTS or as special monographs will present the detailed findings.

SCOPE OF THE SURVEY

The data necessary for comprehensive analysis of national health problems are not available from regularly compiled records. Local, State, and Federal health agencies collect information principally on births, deaths, and a limited list of incompletely reported communicable diseases. On the frequency of accidents and disabilities resulting therefrom, only approximate estimates based on records of insurance companies, workmen's compensation commissions, and industrial and safety organizations have been available. As to the provision of medical care, records of doctors, hospitals, and health agencies lack the uniformity and centralization necessary for statistical comparisons. Any adequate picture of care received in relation to needs can be obtained only through family reporting.

SEPTEMBER 15, 1939, pp. 1663–1687

The goal and scope of the 1935–36 National Health Survey of the Public Health Service were defined by George St.J. Perrott, Clark Tibbitts, and Rollo H. Britten in this article which also outlined survey methods and techniques.

U.S. GOVERNMENT PRINTING OFFICE: 1960